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HOME FIRE DEATHS: A PREVENTABLE TRAGEDY

HEARING

BEFORE THE

SPECIAL COMMITTEE ON AGING
UNITED STATES SENATE

NINETY-EIGHTH CONGRESS

FIRST SESSION

WASHINGTON, D.C.

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HOME FIRE DEATHS: A PREVENTABLE TRAGEDY

THURSDAY, JULY 28, 1983

U.S. SENATE,
SPECIAL COMMITTEE ON AGING,
Washington, D.C.

The committee met, pursuant to notice, at 9:35 a.m., in room 628, Dirksen Senate Office Building, Hon. John Heinz, chairman, presiding.

Present: Senators Heinz, Grassley, Pressler, Chiles, and Burdick.

Also present: John C. Rother, staff director and chief counsel; Ruth Ann Weidel, investigative counsel; Isabelle Claxton, communications director; Robin L. Kropf, chief clerk; and Angela Thimis and Nancy Newman, staff assistants.

OPENING STATEMENT BY SENATOR JOHN HEINZ, CHAIRMAN

Chairman HEINZ. Good morning, ladies and gentlemen. The Special Committee on Aging will come to order.

Today, our committee will begin a hearing on the subject of "Home Fire Deaths: A Preventable Tragedy."

Each year, approximately 6,000 people die in about 750,000 residential fires. A grim comparison, illustrated graphically here, is that almost as many Americans were killed in cigarette-caused fires over an 11-year period as were killed in Vietnam. [See chart 1.]

Most of these fire deaths are preventable. Today's hearing will focus on two measures that can substantially reduce the risk of home fire death.

Cigarettes are the leading cause of home fire deaths in the United States. It is an all too familiar story—a carelessly dropped cigarette smolders in a chair, couch, or mattress, and in a few hours, tragedy strikes. I would direct your attention to chart 2, where one can see a variety of causes, approximately a dozen, of residential fire deaths. Over one-third of residential fire deaths are caused by smoking, the greatest cause of such fire deaths. The next greatest cause is heating, accounting for 14 percent of the residential fire deaths. After that follows a variety of other causes.

CHART 1

1961-72

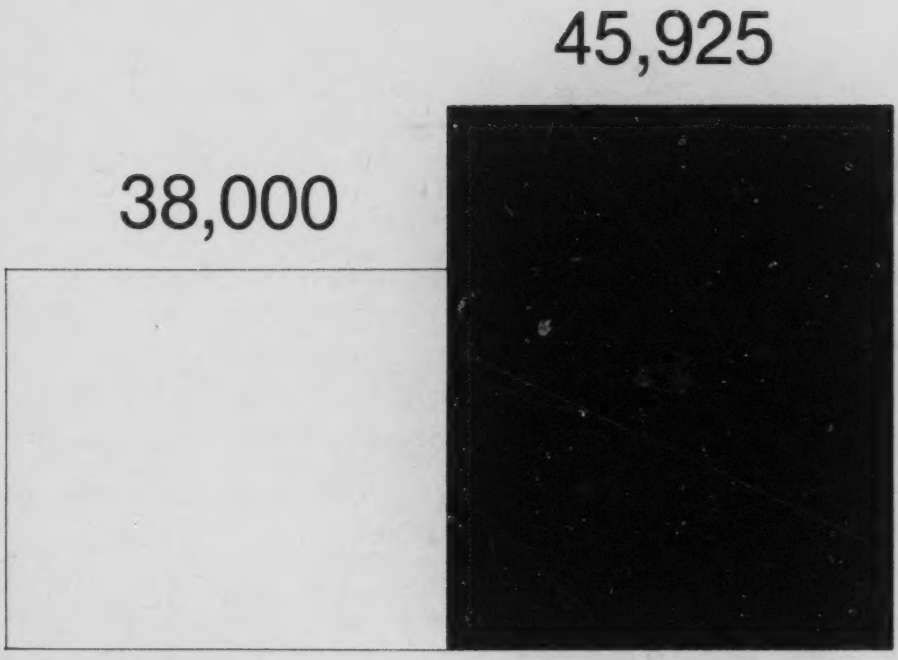
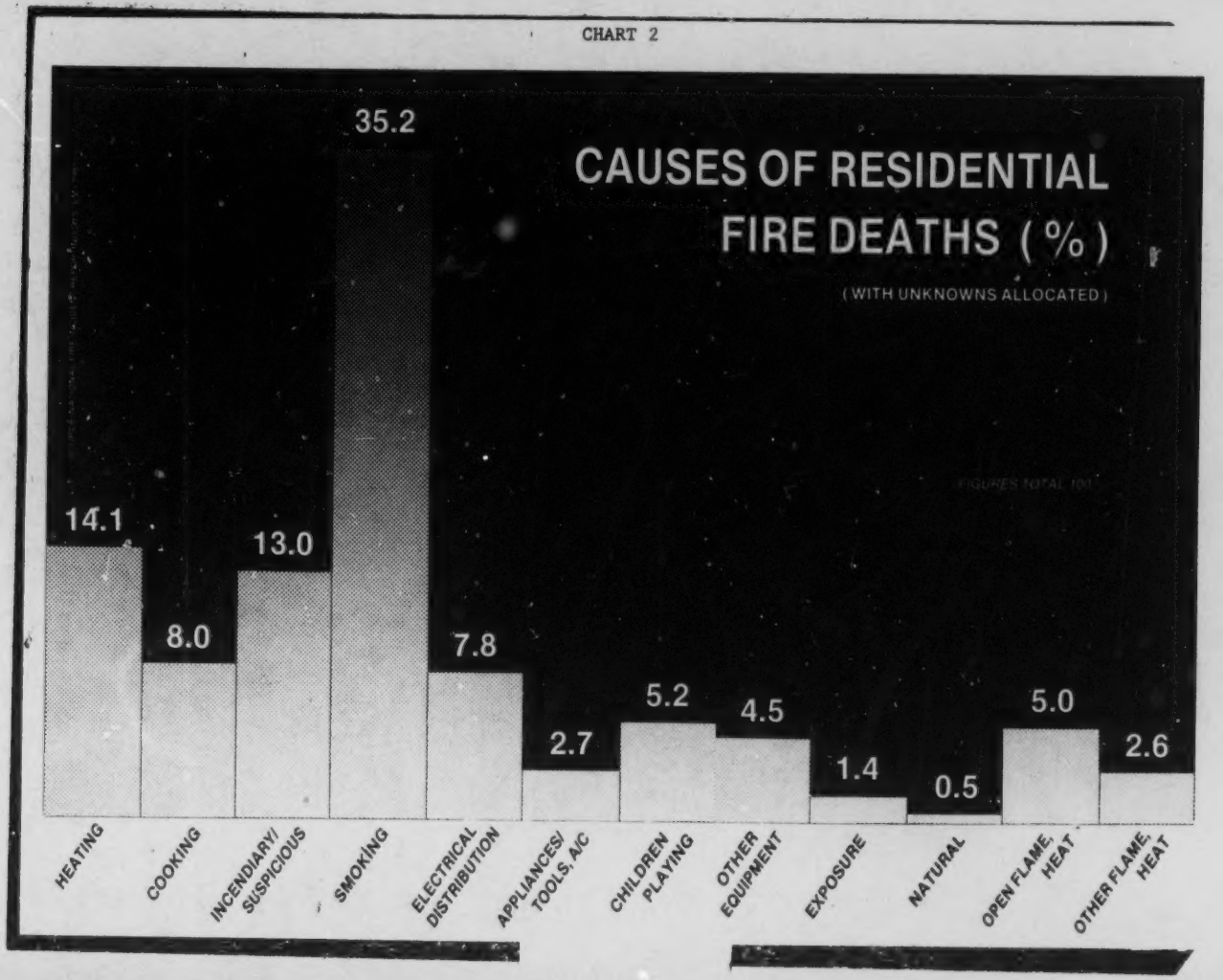


CHART 2


CAUSES OF RESIDENTIAL FIRE DEATHS (%)
(WITH UNKNOWNS ALLOCATED)
14.1
8.0
13.0
35.2
7.8
2.7
5.2
4.5
1.4
0.5
5.0
2.6
HEATING
COOKING
INCENDIARY/ SUSPICIOUS
SMOKING
ELECTRICAL DISTRIBUTION
APPLIANCES/ TOOLS, A/C
CHILDREN PLAYING
OTHER EQUIPMENT
EXPOSURE
NATURAL
OPEN FLAME, HEAT
OTHER FLAME, HEAT

To sum it all up, every day, an average of 16 people are maimed, burned beyond recognition, or killed by cigarette-caused fires. Older persons are two to three times more likely than younger individuals to be victims. Yet, most cigarettes are designed not to self-extinguish but to keep burning as long as there is tobacco to burn. For our elderly in particular, smoking in bed can be aptly called "the sleeping death."

In 1981, cigarettes caused over 2,100 deaths in residential fires, far more than any other single cause. Of those 2,100 deaths, over 35 percent were persons over age 65. An estimated 40 percent of those killed in cigarette fires were persons other than the smoker of the cigarette which caused the fire. Last year, cigarette fires also caused over 3,800 reportable injuries and over $300 million in property loss. So the question is: What can be done?

Today, we shall hear testimony from several distinguished witnesses about a campaign for a fire-safe cigarette, one that will not tend to ignite most common upholstery, mattresses, or bedding materials.

We shall also hear testimony about a second and another highly significant home fire prevention measure—the smoke detector.

Given the disproportionate fire death rate of older Americans when compared to other age groups, greater home fire safety precautions are vitally necessary for our senior citizens. Smoke detectors are an inexpensive and highly effective home fire prevention measure. Yet, in 1980, while two-thirds of the population owned smoke detectors, less than one-third of those over 65 owned them. The risk of dying from fire in a home where detectors are installed is less than half that of dying from fire in homes without the device. They are even more effective in protecting life when the fire is caused by a cigarette because of the smoldering time in such fires. Moreover, the same homes which run the greatest statistical risk of fire, those with annual family incomes of $15,000 or less, are those homes least likely to have smoke detectors. Widespread installation of smoke detectors would cut residential fire deaths almost in half.

Unfortunately, the Federal Government has not moved to effectively address these problems. No Federal agency currently has jurisdiction over the fire safety of the cigarette. Likewise, the Federal Government's role has been limited in the promotion of smoke detectors. Today, we hope to explore what the Federal Government can do in these areas to reduce the tragedy of thousands of lives needlessly lost in home fires.

I look forward to hearing from our distinguished witnesses but before I call on them, I want to call on Senator Lawton Chiles of Florida. Senator Chiles is the distinguished chairman of the Budget Committee. Before he was the distinguished chairman of the Budget Committee, he was the distinguished chairman of the Aging Committee.

Lawton.

Senator CHILES. You promoted me there. The Republicans won control of the Senate in 1980, and I'm the ranking Democrat. But maybe in 1984 I will be chairman.

Chairman HEINZ. I hope that was not prophetic, that is true.

Senator CHILES. I hope it was.

Chairman HEINZ. Ranking minority member on the Budget Committee. I stand corrected.

STATEMENT BY SENATOR LAWTON CHILES

Senator CHILES. Mr. Chairman, I want to congratulate you on setting up these hearings. I think the subject of today's hearing is tremendously important. We are talking about many avoidable deaths and about avoidable injuries to many of our senior citizens. In addition to the deep personal tragedy, those injuries can and have been very costly to the taxpayers. If we could promote the use of low-cost but effective smoke detectors, we would be doing something humane and effective to safeguard and extend the lives of our senior citizens.

So I look forward to these hearings and proposals to improve fire protection methods in the homes of the elderly.

Chairman HEINZ. Thank you, Senator Chiles.

I would only add that I know how great an interest you do take in matters affecting older Americans, and have taken for as long as I have served on this committee. You had some seniority on me, so I know it is a longstanding interest.

I would like to call on Senator Grassley.

STATEMENT BY SENATOR CHARLES E. GRASSLEY

Senator GRASSLEY. Well, again, it seems that this committee comes up with wide, varied, worthwhile, interesting, and different hearings and from that standpoint, Mr. Chairman, you are to be complimented for your contributions and dialog on a variety of issues, this one being no exception.

Of course, this morning we again have a fact-filled brief and knowledgeable panels to provide committee members and the staff with useful oversight information, particularly that dealing with the security and well-being of our citizens.

In preparing for this hearing, I wanted my staff to check with the Iowa State fire marshal. His comments confirmed all the data to be found in the overview prepared by the committee.

Mr. Chairman, I intend to see that this material receives wide circulation in my State. I know the heightened awareness it will bring to older Americans will save lives in my State.

I want to thank you and your staff for the fine work they have done for all Americans in dramatizing the high cost of home fires. And that is the only thing I will say, Mr. Chairman. I am going to have to go at 10 o'clock because I have a markup at the Judiciary Committee.

Chairman HEINZ. Senator Grassley. I thank you very much. We are delighted to have you here. You have been a member of the Aging Committee since you first came to the Senate, but it was not your first service on an aging committee because you served in the House as well.

Senator Burdick.

STATEMENT BY SENATOR QUENTIN N. BURDICK

Senator BURDICK. Mr. Chairman, I too want to commend you for organizing this hearing today. I think we need to look at the prob-

lem of home fire deaths among the elderly, and I think this Committee is an excellent place to do it.

Home fire deaths are a terrible, yet preventable tragedy. We have made important strides in protecting those in nursing homes and in similar group homes. In North Dakota, we also have enacted strict laws for hotels and motels, but we have not addressed the problem of private residences, especially those lived in by the elderly, where the greatest percentage of fire deaths occur.

I might say at this point that North Dakota is now currently conducting a public awareness program about the dangers of home fires. North Dakota is also drafting regulations to require smoke detectors in new homes, so we are moving on this front.

The national statistics for home fire deaths among the elderly are tragic, but I am sorry to say that the statistics for my State of North Dakota are even worse. About 12 percent of our population is elderly, but older citizens account for nearly 33 percent of the deaths caused by home fires in our State.

I think this problem is going to become more critical as we expand home health services. The North Dakota Legislature just this year made a serious commitment to home health because it is what the people want. I am sure similar commitments are being made in other States. This means, however, that there will be more homebound and frail elderly living in private homes. They would be especially vulnerable if fire broke out.

Sixty-six percent of the elderly in this country do not have smoke detectors in their homes. That is almost double the number of unprotected homes in the rest of the population. Greater public awareness can go a long way to improve this situation, but I think we should explore ways of doing more through the private sector as well as the public one.

I am not sure what the Federal role in this should be. Of course, that is one of the purposes of this hearing. One idea to explore, however, is a slight expansion of the weatherization program to include the installation of smoke detectors. This program is already set up. It already identifies low-income homes, mostly occupied by the elderly, and it already has workers who fix up these homes. I cannot predict how the Department of Energy would feel about piggybacking this work on top of weatherization, but I think it is one of the ideas we should explore as far as the Federal role is concerned and perhaps do so in this hearing.

Thank you, Mr. Chairman.

Chairman HEINZ. Senator Burdick, I thank you very much.

Before calling on our first witness, I am going to insert the statement of Senator John Glenn into the record.

[The statement of Senator Glenn follows:]

STATEMENT OF SENATOR JOHN GLENN

Mr. Chairman, I am pleased that the Senate Special Committee on Aging is holding this hearing to examine the vital need for increased fire protection measures for older Americans.

During this hearing, we will look at ways of reducing the risk of death or injury to our senior citizens from fire. We will discuss why smoke detectors, which are inexpensive and very effective safety devices, have not yet been installed in most older persons' homes. We will receive testimony about the practical aspects of developing a cigarette that will not ignite most common upholstery, mattresses, or bed-

ding material. We will learn about innovative programs that have been developed to promote fire safety. And we will discuss additional measures that may be taken to protect the life and property of our Nation's senior citizens from the tragedy of fire in the home.

The elderly are more likely to die in fires than are any other age group. The National Safety Council estimated that of the 4,000 people who died by fire in 1981, 1,250 were age 65 or over. Older Americans comprise 11 percent of our population, yet they represent more than 25 percent of the deaths by fire. Moreover, 40 percent of all fire victims were over age 55. These statistics illustrate the extraordinary vulnerability of our older citizens in fires.

Smoke detectors are an effective but underutilized means of fire protection. The presence of a smoke detector cuts the risks of dying from a fire in half. While 66 percent of all households had at least one smoke detector in 1980, less than 34 percent of the elderly owned these devices. Smoke detectors are especially good at reducing deaths due to fires caused by cigarettes and cigars. The chances of death are four times greater when no smoke detectors are present. The early warning provided by smoke detectors has been shown to reduce fire injuries and may reduce property losses by up to 20 percent. In our discussion today, we shall examine some current Federal programs that may be utilized to promote the installation of smoke detectors.

As the author of the Anti-Arson Act of 1982, Public Law 97-298, I favor a strong Federal role in the development of an antiarson and fire prevention strategy. While it is not the Federal Government's role to directly fight fires, it can nevertheless provide invaluable research and technical assistance to State and local governments in this area.

I have been concerned over attempts by the Reagan administration to weaken existing Federal programs for arson and fire prevention. I have urged my colleagues to keep the Center for Fire Research at the National Bureau of Standards adequately funded so that new firefighting techniques and equipment may continue to be developed. Research at the Center has contributed to the development of smoke detectors, residential sprinklers, and protections against mattress and carpet ignitions. If funding is eliminated, the Center's vital research role will be lost and local firefighting efforts will suffer.

The Federal, State, and local governments must work together in preventing the death and destruction that threatens all Americans, especially the elderly. I look forward to receiving suggestions from today's witnesses on what programs and procedures could be implemented to help protect our Nation's elderly from tragic home fires.

Chairman HEINZ. We are very privileged and pleased to have as our first witness this morning John Gerard, Washington representative of the National Fire Protection Association. I understand that Mr. Gerard is going to testify about the major issues he believes are associated with fire prevention, especially as they affect older Americans.

I also would like to point out that Mr. Gerard is the first of three distinguished witnesses who are either present or former fire chiefs. This room has never been in better hands than it is at this very moment.

Senator BURDICK. Has he checked it out?

Chairman HEINZ. I noticed some eagle eyes out there in our witness chairs before the hearing and I made a special point of checking with them. They are also making sure none of us smoke, I think.

Chief Gerard, please proceed.

STATEMENT OF JOHN C. GERARD, WASHINGTON D.C., REPRESENTATIVE, NATIONAL FIRE PROTECTION ASSOCIATION

Mr. GERARD. Thank you, Mr. Chairman and members of the committee.

The National Fire Protection Association is a nonprofit, technical, and educational membership organization. It was founded in

1896. Since that time, we have been the principal public advocate for fire safety.

To a large extent, as has been identified by the chairman, home fire deaths are in fact a preventable tragedy. NFPA has collected and analyzed data on the fire problem in the United States for well over 50 years. In fact, we are currently the Federal Government's representative for collecting and analyzing fire data.

The most important component to the fire problem is the fatal fire. I think everyone recognizes that the fire in which someone dies is the worst fire we can have. In 1981, there were 4,000 people who died in nonarson fires. Obviously a nonarson fire is a preventable fire. Almost one-third of these persons are over the age of 65. The elderly people in our society are the largest at-risk group in our population.

Our purpose in appearing before this committee today is to present key scientific facts about fatal fires, particularly as they affect the elderly.

We can begin by examining some specific fire data so as to define the problem and thus, perhaps, develop some defenses against the serious threat of unwanted fires. Our fire statistics on fatal fires paint the following picture: One-third of the people who died in nonarson fires are over the age of 65. One-third of all Americans who are killed by fire die in fires started by cigarettes. Cigarettes are far in the lead, as your chart shows, as a cause of fatal fires. Cigarette-ignited fires start in upholstered furniture and bedding in people's homes and apartments. Two-thirds of residential fire deaths occur between the hours of 8 p.m. and 8 a.m. when most people are sleeping. And fatal fires need a head start.

By fire department estimates, 38 percent of the deaths occur in fires that burn over 40 minutes before they are detected.

Putting all these facts together, one gets a picture of the most common fatal fire in America. A cigarette is carelessly discarded, most often in upholstered furniture or bedding. It smolders unnoticed. The heat is trapped in the crevices of the furniture or folds of bedding and a fire starts. Other family members have often gone to bed in another part of the house. The alarm typically is given in the middle of the night by a neighbor or passerby who sees smoke or fire. The fire department arrives promptly, but too late to save the victims. Death is generally due to smoke and toxic gases rather than flames.

If we prevent the ignition or the fatal consequences of this one fire scenario, that alone will have an enormous impact on fire fatalities. A solution to this fire scenario must be found. To prevent ignition means developing fire-safe cigarettes. To reduce fatalities means early warnings when fires do start. In other words, that means smoke detectors.

The technical problems of cigarette combustion and of the interaction between a burning cigarette and upholstered furniture or bedding are complex. NFPA is convinced that there is a real need for more research and for the development of proper fire-safety criteria with respect to cigarettes. We strongly recommend that the Center for Fire Research at the National Bureau of Standards analyze the technical evidence from all sources and develop criteria for the design of cigarettes so as to decrease the incidence of cigarette

fire ignitions. The Center for Fire Research should also develop a test method by which the performance of cigarettes could be measured to determine compliance with the criteria. The Center has done much preliminary work on cigarette ignition and has considerable expertise and the facilities to carry out this research.

I think it is fair to recognize that one of the most important areas of effort in reducing fire fatalities has been in expanding the use of smoke detectors. Over the past 5 years, fire deaths have been declining in the United States. This decline in fire deaths in the home can be associated with the widely increased use of smoke detectors in some two-thirds of our U.S. residences. The remaining one-third is mainly comprised of those segments of the population which suffer most from fire, namely the poor and the elderly.

In summary then, we can say that the elderly suffer a disproportionate share of the devastation and tragedy associated with fires. The elements of tragedy are simple. One element is the high number of elderly persons who die in fires. Another is the primary cause of fatal fires in the home—careless smoking.

Finally, the homes of the elderly and the poor are significantly underprotected by smoke detectors.

To deal with this problem, we must reduce the causes and improve our defenses.

Mr. Chairman, I would be happy to answer any questions that you have.

Senator HEINZ. Mr. Gerard, thank you very much. Your prepared statement will be entered into the record at this point.

[The prepared statement of Mr. Gerard follows:]

PREPARED STATEMENT OF JOHN C. GERARD

The National Fire Protection Association (NFPA) is a nonprofit, technical, and educational membership organization, founded in 1896. It has remained the principal public advocate for fire safety since its inception.

Our membership is drawn from the many disciplines involved in, and concerned about, the national fire problem. We are not a trade or industry association. No one group or interest is dominant. The only common denominator in our membership is a concern about fire safety. Our members include fire service personnel, fire marshals, electrical inspectors and city managers; architects, engineers and educators; health care facility operators and similar groups from commerce, industry, insurance and the Federal Government. In addition, NFPA's sources of income are so diverse that no single interest group can exercise financial influence. The many activities of NFPA are described in attachment A.[1]

THE FIRE PROBLEM FOR THE ELDERLY

To a large extent, home fire deaths are a preventable tragedy. NFPA has collected and analyzed data on the fire problem in the United States for well over 50 years. There are many components to this pressing public problem. By far, the most important component of the fire problem is the fire that takes lives—the fatal fire. In 1981, 4,000 people died in nonarson fires. Almost one-third of these are persons over the age of 65. This is the largest at-risk group in our population.

Our purpose in appearing before this committee today is to present key scientific facts about fatal fires, particularly as they affect the elderly.

When we talk of the elderly, about whom are we speaking? In 1980, 11 percent or 25 million Americans were over the age of 65. This segment of our population continues to grow faster than the younger population. In discussing living arrangements, we need to recognize that most aged live in family settings—8 out of 10 older men and 6 out of 10 older women. Less than 5 percent of all aged live in institutions. As Robert Lightman, executive director of the National Senior Citizen Educa-

[1] Retained in committee files.

tion and Research Center, says in the NFPA Fire Safety Educators Handbook, "In providing fire safety services to older persons, information frequently will have to be geared to the person living in an apartment or house—and this person may be especially vulnerable because he/she is alone."

It would thus appear that a very clear priority must be dealing with the elderly in the home. We are long overdue in determining how fire affects the elderly in a family or at-home setting so as to reduce the threat of fire and improve the quality of their lives.

We can begin by examining some specific fire data so as to define the problem and, thus, develop defenses against the serious threat of unwanted fires.

Our fire statistics on fatal fires paint the following picture:

One-third of the people who die in nonarson fires are over the age of 65.

One-third of Americans who are killed by fire die in fires started by cigarettes. Cigarettes are far in the lead as a cause of fatal fires.

Cigarette ignited fires start in upholstered furniture and bedding in people's homes and apartments.

Two-thirds of residential fire deaths occur between the hours of 8 p.m. and 8 a.m. when most people are sleeping.

Fatal fires need a head start. By fire department estimates, 38 percent of the deaths occur in fires burning over 40 minutes prior to detection.

Putting these facts together, one gets a picture of the most common fatal fire in America. A cigarette is carelessly discarded, most often in upholstered furniture or bedding. It smolders unnoticed. Heat is trapped in the crevices of the furniture or folds of bedding and a fire starts. Other family members have often gone to bed in another part of the house. The alarm is given in the middle of the night by a neighbor or passerby seeing smoke or fire. The fire department arrives promptly, but too late to save the victims. Death is generally due to smoke and toxic gases rather than flames.

There is a consensus about this portrait of a typical fatal fire and about the statistical facts that underlie the scenario. These findings have been corroborated by the National Fire Protection Association, the United States Fire Administration, the Johns Hopkins University, and the United States Consumer Product Safety Commission. The basic conclusion is always the same: one-third of the people who die in fires are killed by fires started by cigarettes.

We have emphasized this grim concentration of fire deaths in cigarette-ignited fires because this very concentration can also be used as part of the remedy of the fatal fire problem. If we prevent the ignition or the fatal consequences of this one fire scenario, that alone will have an enormous impact on fire fatalities. A solution must be found. The tragic consequences of these fatal ignitions must be prevented by one method or another.

POSSIBLE SOLUTIONS

Fire-safe cigarettes

The technical problems of cigarette combustion and of the interaction between a burning cigarette and upholstered furniture or bedding are complex. We are convinced that there is a real need for more research and for the development of proper fire safety criteria with respect to cigarettes, as well as upholstered furniture. We strongly recommend that the Center for Fire Research at the National Bureau of Standards analyze the technical evidence from all sources and develop criteria to which the tobacco industry can design its cigarettes so as to decrease the incidence of cigarette fire ignitions. The Center for Fire Research should also develop a test method by which the performance of cigarettes could be measured to determine compliance with the criteria. The center has done much preliminary work on cigarette ignition and has considerable expertise and the facilities to carry out this research.

The NFPA believes, however, that standarization should be left to the independent standard development system. While the NFPA does develop and promulgate many safety standards, it does not deal with product standards. We are firmly convinced, however, that a similar standards development group can develop the standard with which to create the fire safety so essential in this area. Consensus standards-setting in the United States has a record of being efficiently and effectively performed in the non-Government sector by independent standards groups such as the American Society for Testing and Materials (ASTM), the NFPA and others.

Smoke detectors

One of the most important areas of effort has been in expanding the use of smoke detectors. NFPA has conducted a series of major campaigns designed to encourage and implement the installation of smoke detectors in homes, apartments, and other residential occupancies—the scene of most fire deaths.

As a result of this and parallel Federal Emergency Management Agency (FEMA) efforts, the recent decline in fire deaths in the home can be associated with the widely increased use of smoke detectors in some two-thirds of U.S. residences. The remaining one-third is comprised of those segments of the population which suffer most from fire, namely the poor and the elderly. Lack of funds for smoke detectors causes needless loss of life among this segment of our society. NFPA is presently working on a program to address this crucial element of the fire problem. NFPA's project, once established, will have an immediate and positive impact on life safety for our poor and elderly. NFPA will be delivering proven model programs to major cities and urban counties. As these programs are implemented through local fire departments and community leaders, detectors will be increasingly available to the elderly and the poor.

Public education

NFPA recognizes that fatal fires in American residences are a serious problem. Accordingly, we have many major programs already in progress that are effectively reducing the loss of life from fire today. We are intensifying these efforts as our own funding permits. A couple of the ongoing NFPA programs (by no means all) are:

Our "learn not to burn" curriculum, which is in 25,000 classrooms across the country, reaches into millions of American homes.

For several years, we have sponsored an intensive media campaign using the television actor Dick Van Dyke. This program has shown significant good results, with a documented success of saving over 116 lives already.

The home fire safety audit program, funded in the past through several Federal programs, trained senior citizens in the skills necessary to conduct fire safety inspections in their communities. This was an excellent self-help program.

In addition, as a direct result of the danger of fires started by cigarettes, we must make manifest the public responsibility that smokers bear for exercising extreme care in the handling of cigarettes. Educating the public on this matter is a fundamental part of fire prevention. This could be accomplished through the development of a training program to be delivered by and for senior citizens, focusing on the proper exercise of personal responsibility in the area of fire safety.

SUMMARY

In summary then, we can say that the elderly suffer a disproportionate share of the devastation and tragedy associated with fires. The primary elements of the tragedy are simple. One element is the high number of elderly persons who die in fires. Another is the primary cause of fatal fires in the home—smoking. Finally, the homes of the elderly and the poor are significantly underprotected by smoke detectors.

To deal effectively with this problem, we must reduce the causes and improve our defenses. It can be done. It must be done.

Chairman HEINZ. Mr. Gerard, I want to reflect for a moment on a situation in my home State of Pennsylvania. About 11 percent of our population is elderly; yet, the elderly account for 25 percent of all the fire-caused deaths in our State. In other words, they are about 2½ times more likely than other age groups to be the fatal victims of fires. This is not an unusual pattern.

Mr. GERARD. That is correct.

Chairman HEINZ. I think this pattern is replicated, more or less, in State after State.

You have made a very strong plea to have the National Bureau of Standards Center for Fire Research develop standards and tests for fire-safe cigarettes. We are probably going to get some testimony on this a little later on, unless my advance warning system misleads me.

Is this work difficult or impossible to do?

Mr. GERARD. I have no idea. That is why we need the research. I think that the issue really boils down to having an organization of scientists who have no ax to grind, who have a reputation for objectivity and good scientific research, to evaluate all of the issues with relation to self-extinguishing cigarettes and make a determination. Is it possible to develop a fire-safe cigarette? I believe it is. The NFPA believes it is. But we are not scientists, and so the scientific research needs to be done and we believe the Center for Fire Research can most effectively do that.

Chairman HEINZ. In effect, you are saying that you would like to see a piece of legislation that mandates the Center to study this issue and then tell us whether or not they can (a) establish a standard, and (b) test accurately to that standard?

Mr. GERARD. Yes, Mr. Chairman, with a legislative mandate to perform the research, it will get the issue off of dead center. It will get the research accomplished and Congress will then have a clear picture of whether this is realistic. We will not have to deal with whether or not it is based on nonscientific testimony, and we can, in fact, then move ahead to deal with one of the most serious fire causes in the United States today.

Chairman HEINZ. With all the study that cigarettes have received since the founding of the first colony, one would think we would know a little bit more about tobacco since its discovery in the 16th century.

What is wrong with just telling the National Bureau of Standards to develop a set of standards today? Why would that be the wrong thing to do?

Mr. GERARD. First of all, to develop the standard, just as an example, should the standard say that a cigarette should self-extinguish in 30 seconds, 1 minute, 3 minutes, 5 minutes? Should the cigarette be manufactured to burn faster so that the heat does not stay on the ignitable material and thus not cause a fire?

In other words, there are a lot of issues. What is a cigarette that would be safe? There is scientific engineering research that needs to be done to identify that.

Chairman HEINZ. Why has not the National Bureau of Standards Center for Fire Research done some of that research already?

Mr. GERARD. I think they have done some of that research. Mostly, the focus in the past has been on the upholstered furniture. In other words, how much heat and how long does it have to burn to ignite upholstered furniture in order to develop a better upholstered furniture. I cannot say for sure why NBS has not done the research on the self-extinguishing cigarette, perhaps because there is no one that controls that.

Chairman HEINZ. One last question. I would note that there are some 29 States that require smoke detectors in all new classes of residential construction. My home State of Pennsylvania is not a State that requires smoke detectors in all classes of residential construction, but does require it in certain construction.

In your opinion, how can the Federal Government help in the effort to get smoke detectors in the homes of our citizens least likely to have them? As you pointed out in your statement, those least likely to have them and most at risk tend to be the poor and the elderly.

Mr. GERARD. Yes sir, that is correct, and those are statistics that come up in everyone's analysis. I think some of the things that the Federal Government can do—Senator Burdick hit on one—is perhaps make smoke detectors a part of the weatherization process. While it is not a weatherization issue per se, it does focus on improving the quality of life in American homes for the elderly. There can be caveats placed in funds or block grants in various States, particularly those States that do not require that type of legislation.

Are you going to leave and vote on something?

Chairman HEINZ. Well, that is what it looks like. We are just checking on that. I am sorry, I was distracted by giving my staff instruction. Would you just repeat your last comment?

Mr. GERARD. Yes, sir. I believe Senator Burdick hit on one method and that is to tack onto the weatherization program the installation of smoke detectors. There can be caveats placed in block grants through HUD and in those States that do not require smoke detectors, it can be required that they be installed. The Federal Emergency Management Agency has money to spend on a variety of programs. Some of that money should be redirected into programs that will increase the number of detectors in the homes of the poor and the elderly.

Chairman HEINZ. The largest of those programs you have mentioned is the community development block grant program.

Mr. GERARD. Yes, sir.

Chairman HEINZ. Is it permissible to use community development block grant money now for smoke detector installation?

Mr. GERARD. Yes, sir, there are places where this money is already being used for this purpose. In fact, the small town of Quincy, Mass., where our association headquarters are located, uses block grant funds to install smoke detectors in the homes of the poor and the elderly. It is a very successful program but it does require, obviously, that the local elected officials make that decision to spend that money there. Of course, to spend the money in some cases requires enabling legislation and in States that do not have that legislation, perhaps some leaning from the Senate side or from the Federal Government could get the States to adopt that legislation.

Chairman HEINZ. Of the various programs that are available: community development block grants, community services administration money, weatherization money, money spent by area agencies on aging under its various titles, probably title III, are any of these particularly preferred by you as a method, or is it your view that under these programs, anything that can be done should be done?

Mr. GERARD. Well, I believe that the problem is serious enough that we should do anything and everything we can in order to improve the representation of smoke detectors in the homes of the poor and the elderly. The NFPA has a program that focuses on developing private funding sources such as the program in Baltimore that does not use any Government money to install smoke detectors in homes of people who do not have detectors. I think the issue is one of leadership and I believe that every person, every organization, and every government body that has a leadership responsibili-

ty, and certainly all three of those have leadership responsibilities, I think we all need to do everything we can within our sphere of influence to improve the quality of life for all of our people. And when you have an identifiable population group such as the elderly, and you have an identifiable absolute guaranteed solution to a serious problem that they have, I think that we need to identify that we have a serious responsibility to move into that area and exert whatever leadership we can.

Chairman HEINZ. I would only note that in my home State of Pennsylvania, which receives literally tens of millions of dollars in community development block grant money, we canvassed 36 entitlement cities. Eighteen of them have no money in smoke detector programs and 18 do have funds in smoke detector programs. But of those which do fund programs, 13 devote less than $10,000, with some as low as just $100. I would like to point out that, under the HUD guidelines, a city must have at least 50,000 people to be eligible for the HUD block grant, so we are not talking about very small towns. The $100 would not go very far in providing smoke detectors in a community of 50,000. Would you not agree?

Mr. GERARD. Yes, Mr. Chairman. In fact, I think that is the cruelest action that anyone can take, that is tokenism, to pretend that some money is being used to improve the quality of life for people when any sensible person could look at that and say that that is strictly a token. That is really a cruel hoax to play on the people who have in fact devoted their lives to building this country and making it the great country that it is.

Chairman HEINZ. One last question.

What do you think the other group with an interest in fire safety, besides the fire chiefs and the elderly, and the poor, and the people who live in homes, namely the insurance companies who insure those residences, should be doing?

Mr. GERARD. I believe that some insurance companies are already providing a discount on fire insurance for the installation of smoke detectors. One group that is routinely forgotten about when we talk about groups like that is realtors. You know, real estate people make a lot of money on their property in the communities in which they do business and they are a group, in addition to the insurance companies, whose funds flow directly out of the property that exists in our communities. Their income comes from the owners of that property. I think that we need to focus more aggressively on insurance companies, real estate people, and the energy companies that provide the fuel oil and gas, and so forth, in the homes.

In other words, it is a property-related issue that directly affects people and those companies and organizations that receive their income from the fact that in America people own their own property. I think those organizations and companies need to make a stronger commitment to improving the quality of life for those people who represent their income source.

Chairman HEINZ. Mr. Gerard, I want to thank you for your excellent testimony.

To sum it up, you have confirmed what our initial research demonstrated, namely that cigarettes are by far and away the leading cause of residential fire deaths—they are far and away the leading

cause of elderly fire deaths and they disproportionately affect the poor.

You have made two very concrete suggestions: First, to investigate as quickly as possible the feasibility of developing a fire-safe cigarette; and second, at a minimum, to give a much stronger mandate to the various Federal agencies that provide funds for community and housing needs to be cognizant of fire safety needs, specifically through the installation of smoke detectors.

Those are very good suggestions indeed and you may rest assured that we will take them very much to heart.

Mr. GERARD. Thank you, Mr. Chairman.

Chairman HEINZ. Thank you, Mr. Gerard.

Our next group of witnesses will be Andrew McGuire; Nancy Steorts, accompanied by Betsy Wilansky; Dr. Edward Press; and John Rupp.

Please seat yourselves at the witness table.

This is a very diverse and distinguished panel before us. This panel will testify about the problem of cigarette-caused fires as it relates to the general population and especially older Americans. I would expect also that we can discuss the first of the two suggestions that we had from Mr. Gerard, namely the development of a low-ignition potential cigarette as a means to reduce the incidence of death and injury associated with fires.

I would appreciate witnesses being cognizant of the fact that we do not want our hearing to run over our time limit, so anything you can do to keep your statement to the 5-minute limit would be greatly appreciated, especially because we never know when votes are going to occur and cause us to run like a firetruck over to the floor of the Senate.

Let me ask Mr. McGuire, executive director of the Burn Council, San Francisco General Hospital in California, to be our first witness.

STATEMENT OF ANDREW McGUIRE, EXECUTIVE DIRECTOR, THE BURN COUNCIL, SAN FRANCISCO GENERAL HOSPITAL, SAN FRANCISCO, CALIF.

Mr. MCGUIRE. Thank you, Senator.

In the middle of my testimony I would like to show about a 90-second clip from this film, so I would like to alert the people here to that point.

Chairman HEINZ. I think we are ready to roll. Would you like us to do that now?

Mr. MCGUIRE. In the middle.

The No. 1 cause of fire death in America is the cigarette fire. The latest Government statistics tell what I consider a very grim tale.

There are over 2,100 deaths a year, nearly 4,000 burns and injuries, and over $300 million in property damage due to about 60,000 fires caused by cigarettes each year.

Most horrifying is the fact that the people most at risk are the elderly. According to a study of the causes of fire deaths conducted at Johns Hopkins, researchers discovered that the elderly were being burned to death at twice the rate of other age groups. An-

other study, which recently appeared in the Journal of the American Medical Association, showed that 39 percent of the people who were killed in cigarette-caused fires were not the cigarette smokers themselves. Innocent people are being routinely killed in cigarette fires. It appears reasonable that Congress should act to prevent these senseless deaths.

I suggest that the solution is at hand. Specifically, cigarette companies should be required to manufacture fire-safe cigarettes. Or, simply put, they should produce cigarettes that will not ignite furniture or bedding. What I am suggesting is not complex technology waiting to be developed. What I am suggesting is currently in the marketplace. Two brands of cigarettes, Shermans and Mores—made by R. J. Reynolds—have been tested in fire research labs and were shown to have a significantly lower propensity for igniting furniture. In short, two cigarette companies have inadvertently created fire-safe cigarettes. In fact, a quote from the April 19 New York Times sheds light on the issue:

> R. J. Reynolds makes More cigarettes, one of two brands now available that extinguish easily. Mr. Walker—a spokesman for R. J. Reynolds—said that this was merely a byproduct of the brand's development. * * *"

I believe all cigarettes should be fire-safe as a byproduct of their development.

At this point, I would like to show about a 90-second clip. This will demonstrate what happens to flammable pieces of furniture, mockups in a fire lab routinely used. This is flammable cotton with cotton stuffing. The researcher there in the lab in California is putting Pall Mall's and other brands, about a dozen brands of cigarettes, on these pieces of flammable furniture. It took about 5 minutes to light all the cigarettes and get all the mockup furniture with the cigarette in the crevice with the piece of white cotton over the cigarette to replicate worst-case flammable situations. As was described by Mr. Gerard, the time that it takes for the smoldering ignition to occur is generally about 10, 15 minutes or more. Some of these cigarettes in this film actually ignited within about 20 minutes and at the last shot, you are going to see that a Sherman cigarette, after 1 hour, had not ignited the mockup. The final shot that you will see in this display will be the fact that that Sherman, after an hour, had self-extinguished in fact and did not ignite flammable furniture.

Chairman HEINZ. These are they [holding up package of Sherman cigarettes], I gather?

Mr. MCGUIRE. Correct.

Regarding the production of fire-safe cigarettes, I am not alone in believing this should be done. Since I began the campaign for fire-safe cigarettes 4 years ago, there have been numerous organizations that have officially backed this effort. Among these groups are the American Medical Association; the National Fire Protection Association; the American Public Health Association; the American Burn Association, which is an organization of all of the burn surgeons and burn nurses in this country; the International Association of Fire Chiefs; the International Society of Fire Service Instructors, the International Association of Fire Fighters, AFL-

CIO; the California Gray Panthers; the Junior Leagues of California; and other health, fire, burn, and consumer organizations.

Part of this campaign is simultaneously occurring at the State level through the introduction of fire-safe cigarette legislation. These States include California, New York, Connecticut, Oregon, Massachusetts, Illinois, Michigan, Virginia, Maryland, and, soon, Pennsylvania. There is broad and deep support across the country for fire-safe cigarettes.

Finally, I would like to make a recommendation to this committee. At a minimum, we need an all-out effort by various Government agencies—the Center for Fire Research, the Consumer Product Safety Commission, the National Institutes of Health—to investigate this issue and develop the fire safety criteria that will lead to the prevention of fires caused by cigarettes. This endeavor must be free of any interference from the tobacco industry and should include an oversight committee of concerned experts who can monitor progress.

Finally, State legislative efforts should not be preempted by this Federal effort. The States play the all important role of keeping this campaign moving forward by their efforts to protect their citizens.

In conclusion, too many of our elderly have waited too long for the cigarette companies to voluntarily eliminate the fuses that contribute so heavily to the death toll of America. Far too many have died helplessly in cigarette fires while we have all waited for responsible action by the cigarette industry.

I urge Congress to move forward immediately to solve our shameful fire problem caused by cigarettes.

Thank you.

Chairman HEINZ. Thank you very much, Mr. McGuire.

That was a most interesting film. It will not be recorded on the transcript, but I noticed a tremendous amount of smoke, apparently caused by the cigarettes, coming off the various patches of material. It was remarkable that, in the case of the one cigarette which you mentioned, no such smoking or flammability occurred. It is also interesting to me that there is a guarantee contained on the inside of the cover of this particular brand of cigarettes of the Nat Sherman Co. It says that all of these cigarettes are guaranteed to contain only the finest pure natural tobaccos, unlike most commercial cigarettes. These cigarettes contain no glycerine, no chemicals, no saltpeter, no tars, and are made from only the best tobacco. Every cigarette, of course, is always advertised as being made from the best tobacco. I think that is quite interesting but we will hear more about that from our other witnesses.

Let me ask Nancy Steorts, who is Chairman of the Consumer Product Safety Commission, to please proceed.

STATEMENT OF NANCY HARVEY STEORTS, WASHINGTON, D.C., CHAIRMAN, U.S. CONSUMER PRODUCT SAFETY COMMISSION; ACCOMPANIED BY BETSY WILANSKY, REPRESENTING STUART M. STATLER, COMMISSIONER, U.S. CONSUMER PRODUCT SAFETY COMMISSION

Ms. STEORTS. Thank you very much, Mr. Chairman.

It is a pleasure for me to appear before you today as Chairman of the Consumer Product Safety Commission to give my personal views on the issue of fire safety in cigarettes and to review briefly some of the activities of our agency in the overall programs to reduce fire hazards, particularly for older Americans.

The careless use of smoking materials does present a very serious risk of fire to all Americans. Cigarette ignition of furniture and bedding is our country's leading cause of death by fire. In 1981, alone, there were more than 2,100 deaths and 9,500 serious injuries caused by such fires. We at CPSC have worked for quite some time on cigarette ignition hazards by addressing the flammability of such consumer products as mattresses and mattress pads which can ignite from smoldering smoking materials. We have also devoted considerable resources to the voluntary program of the furniture industry in seeking to prevent ignition of upholstered furniture by smoldering cigarettes.

If it is the wish of Congress that CPSC undertake a feasibility study on the ignition factor of cigarettes, my personal request is only that you give us the necessary funding and staff authority to get the job done properly and in a timely manner. Given those essential tools, I would welcome an opportunity to undertake such a study in cooperation with the industries involved. If Congress should mandate rulemaking on cigarette fire safety, I can assure you that it would be preceded by a comprehensive investigation of the ignition risk.

Such rulemaking investigations would require sufficient time to establish both the technological practicability and the economic reasonableness of a standard. I might also assure you, Mr. Chairman, that the Commission would be quite willing to work cooperatively with industry to develop a voluntary standard on cigarette fire safety, if Congress extends such jurisdiction to CPSC.

I believe that a standard on cigarette ignition could significantly reduce injuries and deaths from smoldering upholstered furniture and mattress fires. Such an effective standard could help to close the loop on this continuing flammability problem, with the current work on upholstered furniture and mattresses providing the other aspect of this safety program.

In order for this committee to fully understand that fire safety is of utmost concern to CPSC, I should point out that several of the areas being discussed this morning are priorities of the Commission, either for the current fiscal year or for next year, or both.

For example, smoldering ignition of furniture and bedding is a priority for both years, in view of the severity of the problem around the country. Fire is the fourth leading cause of accidental death in the United States, and the second leading cause of accidental death in the home.

Smoke detectors have been a major emphasis of our agency and one of our true success stories. In realizing the substantial hazards brought on by smoldering ignition and other residential fire hazards, CPSC launched a nationwide campaign through fire departments, insurance companies, and State and local agencies to promote the wider use of smoke detectors in the homes of America. Although there is obvious need for a continuing emphasis on smoke detectors, our priority program has met with such success

that we have been able to redirect some of our resources from this information and education campaign for the next fiscal year.

Chairman HEINZ. That is quite an ambitious undertaking.

Ms. STEORTS. I would like to provide for you a very detailed report of what we are doing in this area and I would like to provide that for the record.

Chairman HEINZ. We would be delighted to receive that and I will share a copy of it with my colleagues on the Senate Banking, Housing, and Urban Affairs Committee.

Ms. STEORTS. Excellent. We would be very, very pleased also to have the support of this committee on this endeavor. We are working very closely at the State and local level in this area. We are working through fire departments. As a matter of fact, I was in your city of Philadelphia addressing the fire marshals convention just this past fall. They are working very closely with us in this endeavor.

[Subsequent to the hearing, Ms. Steorts submitted additional materials relative to the Consumer Product Safety Commission's efforts in fire safety, including the following on smoke detectors. All other material submitted has been retained in the committee's files.]

SMOKE DETECTOR PROGRAM

The fiscal year 1983 priority project encouraged cities and States to promote the use of smoke detectors. Over 165 communities launched either information and education and/or giveaway programs, or sold smoke detectors at cost. More than 27 additional cities have similar programs in the planning process.

States have been encouraged to adopt model codes requiring smoke detectors. Print materials were developed and distributed to promote the use of smoke detectors and proper maintenance for those already in homes. The Commission has worked closely with insurance companies to encourage them to provide discounts and smoke detector information to policyholders.

CPSC's Chairman, Commissioners, and staff have been very active in promoting the use of smoke detectors by responding to requests for media interviews, making speeches that include smoke detector information, and working closely with national organizations.

Ms. STEORTS. A new CPSC priority for fiscal year 1984 is toxicity of combustion products, which has developed from the extensive evidence gathered in the studies of smoldering ignition and from other sources. Residential fires from all causes kill approximately 5,600 Americans every year. Among these fatalities, approximately 70 percent are attributed to the inhalation of toxic gases. Carbon monoxide is generally accepted as the major single cause of smoke inhalation deaths. However, there is growing concern about toxic gases resulting from fires smoldering in a wide range of manufactured goods.

Mr. Chairman, there is one other priority project that I would just like to briefly mention which is very important to us for 1984, and that is safety for the older consumers. We will be working very closely commissionwide on this and we also would be willing to work very, very closely with your committee on it.

Mr. Chairman, in summation, there were an estimated 35,000 residential fires in this country in 1981 in which upholstered furniture was the first item to ignite. Among these fires, 22,500 were caused by smoking material, primarily cigarettes. These fires, involving upholstered furniture only, resulted in 1,200 deaths from

cigarette ignition. There is clearly a problem associated with smoldering ignition. We at CPSC, using our present jurisdiction, have been working on one side of the problem—furniture and mattress fabrics. The thrust of this hearing is to look at the other side of the problem—the smoking material. I commend you for your insight and interest in this important subject.

Again, it is a pleasure for me to be here to offer these concise views and I will be glad to respond to any questions you may have for me or for the Consumer Product Safety Commission.

Chairman HEINZ. Madam Chairman, thank you very much. You are accompanied by Betsy Wilansky, a member of the staff of the Commission. It is my understanding that she has some remarks on behalf of Commissioner Stuart Statler.

Ms. WILANSKY. That is correct.

Chairman HEINZ. Would you please proceed?

Ms. WILANSKY. Thank you, Mr. Chairman.

Commissioner Statler asked me to convey to the committee his deepest regrets for not being able to attend today. I will be commenting from his written testimony.

Obviously, to protect our senior citizens, we must reduce the number of fires afflicting them. As others have indicated, cigarette ignition of furniture and bedding accounts for nearly 71,000 fires annually, making it this country's leading cause of death by fire. In 1981 alone, some 750 persons over age 65 were killed and another 930 seriously injured by such fires. As the movie indicated, smoldering cigarettes left on upholstered furniture and bedding are the source of these fires. A cigarette smolders because it is not designed to go out when lit but not puffed. It continues to burn for some 20 to 40 minutes. Meanwhile, the heat generated by a dropped cigarette spawns smoldering ignition, dense smoke and toxic gases, and often flames. And a fire does not discriminate. It may wipe out the careless smoker or, just as likely, innocent nonsmokers, old and young, who happen to be in its path.

Yet, this agency—charged by law with reducing unreasonable risk of injury and death—must sit with its hands tied. The Commission is barred by statute from regulating the real culprit in these fires, the cigarette. We are forced to look to back-door methods to prevent the inevitable effects of long-burning cigarettes. As our Chairman has indicated, rather than focusing on the ignition source, we are left trying to make all possible contact surfaces more smolder resistant. To remedy this situation, Commissioner Statler supports enactment of S. 51, the Cigarette Safety Act.

As you know, this bill calls for the CPSC to develop performance standards to alleviate the cigarette fire hazards. Should this proposal prove unacceptable, however, then at a minimum, the tragic loss from cigarette fires suggest the need for a congressionally mandated study. The American public deserves no less.

This study could review the technical and economic feasibility of producing fire-safe cigarettes, that is cigarettes with a lower propensity to ignite furniture and bedding. Such a study would provide Congress detailed information to make future decisions on dealing with this fire crisis. A study would insure rigorous public debate and scrutiny of this pressing public safety concern.

In closing, quoting from Commissioner Statler, I must say that I do not understand the tobacco industry's unwillingness to do everything in its power to reduce the increasing number of cigarette fires. If one of the industry leaders would take up the challenge and commit its considerable expertise and resources, I am confident that fire-safe cigarettes would be on the market shortly. If just one company would seize the initiative, as a society, old and young, smoker and nonsmoker, we would be a whole of a lot safer.

Thank you.

Senator HEINZ. Thank you very much, Ms. Wilansky. The statement of Commissioner Statler will be inserted into the record at this point.

[The statement of Commissioner Statler follows:]

STATEMENT OF COMMISSIONER STUART M. STATLER, U.S. CONSUMER PRODUCT SAFETY COMMISSION

INTRODUCTION

Thank you for inviting me here this morning to express my personal views about alleviating the unacceptably high number of fires now ravaging our elderly population. As you know, our senior citizens are particularly vulnerable to fires. Many have a decreased facility—some a total inability—to escape from a fire quickly. Many don't recover—or recover all too slowly—from burns and trauma resulting from fires.

THE PROBLEM

The first and most critical step to better protect senior citizens is to reduce the number of fires afflicting them. The elderly are all too often the victims of clothing fires. As a group, the percentage of elderly persons involved in clothing fires is alarmingly high. About 70 percent of all deaths from clothing-ignition fires involve persons 65 or older. The reasons are complex. Because of failing health, an elderly person may not fully appreciate or be able to react to fire situations. A match doesn't seem like much of a threat. But if dropped onto clothing while lighting a stove or a cigarette, due to tremors from palsy or other illnesses, the consequences can be disastrous. Also, elderly persons often wear loose, billowing clothing. This type of garment can easily catch fire while an individual is cooking and reaches across a stove to move a pan.

It is not easy to directly assist senior citizens in avoiding these apparel fires. Changing behavior patterns, or mitigating the effects of chronic illness is exceedingly difficult, if not impossible. But by contrast, the toll to the elderly, and thousands of other Americans, from another type of fire—cigarette-ignition fires—can be drastically reduced.

Cigarette ignition of furniture and bedding is this country's leading cause of death by fire. In 1981 alone, over 2,100 people died and more than 9,500 were seriously injured in nearly 71,000 fires started by cigarettes. Age-specific data shows that some 750 persons over 65 were killed and another 930 severely injured by such fires. Nationwide, the sweeping losses from cigarette-ignition fires tolled several hundred million dollars. The accompanying long-term emotional damage is simply incalculable.

These fires start from smoldering cigarettes left on sofas, chairs, sheets, blankets, and mattresses. A cigarette smolders because of its long burn. Ironically, cigarettes are not designed to go out when lit but not puffed. They continue to burn, usually for some 20 to 40 minutes. Meanwhile, the heat generated by a cigarette lying unseen on a sofa or bed spawns smoldering ignition, dense smoke and toxic gases, and often flames.

Even without the flames, toxic fumes and overpowering smoke can wreak havoc. Circulation of these deadly byproducts is aided by heating and cooling systems in homes and institutions alike. A cigarette smoldering in a lounge chair in the smoking quarters of a nursing home can snuff out residents sleeping upstairs in their rooms.

It only takes one forgotten cigarette to touch off an inferno. Flames don't have a conscience. Fire roars through a home, an apartment, a hotel, a boarding house. It

may wipe out the careless smoker or, just as likely, innocent nonsmokers—old and young—who happen to be in its path.

In Portland, Oreg., a 65-year-old man suffered for 10 days before dying from smoke inhalation complications caused by a fire involving smoking materials; in St. Paul, Minn., a 70-year old woman, living alone, died from smoke inhalation following a cigarette fire which ignited a bedroom chair; in San Diego, Calif., a 64-year-old woman, also living alone, died from injuries inflicted by a cigarette fire that started in a sofa.

All too often, a single fire causes multiple deaths. Consider:

In Houston, Tex., 12 guests perished and another 75 suffered smoke inhalation from a fire in a 13-story hotel in March 1982. The fire is believed to have started from a smoldering cigarette discarded into an overstuffed chair. The accompanying toxic smoke spread through the hallway and other rooms.

In San Francisco, Calif., a home fire in October 1982 killed three women, injured two men, and destroyed most of the three-story building. Investigation revealed that the fire apparently originated from a cigarette smoldering on a sofa.

In McLean, Va., seven persons (including two children), about to celebrate an upcoming wedding, died inside a blazing home in May 1980. Only the prospective groom survived. The fire is believed to have been touched off by a cigarette smoldering in an upholstered chair.

And just 2 weeks ago, in Springfield, Mass., four young girls died while seven other persons escaped from a duplex consumed by smoke and flames. The blaze apparently started from careless disposal of smoking materials, since the point of origin was a couch.

The next headline could just as likely—just as tragically— recite a grim tale of multiple deaths from a fire devastating a nursing home, a retirement community, or an apartment complex for the elderly.

The cigarette's long burning time needlessly compounds human suffering. Too often, cigarette makers add substances to make certain that a cigarette keeps burning when lit but not smoked. For example, citrates added to the outer paper insure that it burns continuously and steadily. And nitrates—when added indirectly from soil fertilizers—also prolong burning.

WHAT THE CPSC CAN DO

The tragic toll of life, limb, and property caused by smoldering cigarettes is not an abstraction for me. As a CPSC Commissioner, I am charged by law with reducing unreasonable risks of injury. Yet, the Commission's hands are tied. The Agency is barred by statute from regulating the real culprit in these fires—the cigarette. Congress has said we can try to make the couch or sofa safer, or make the mattress or bedding safer, but lay off the cigarette.

And so we are forced to look to back-door methods to try and prevent the inevitable effects of cigarettes which are made to burn for long periods of time, even when unpuffed. Rather than examining and attempting to correct the ignition source itself, we are left to focusing our efforts on making each and every possible contact surface more smolder-resistant. It's kind of like telling our troops in Vietnam to go win a war, but not giving them the needed authority and support to do so.

The result is that smokers get their long burn and nonsmokers get burned—literally and economically. It's a lot more of a burden on everyone in our society, and a lot more expensive, to make furniture and bedding more resistant to the cigarette than it is to make the cigarette simply burn less long or less intensely. And in the end, consumers buying furniture and bedding end up footing the bill so that smokers can enjoy having a cigarette that won't go out on them.

The Commission oversees longstanding mattress flammability standards which are mandatory. We also work cooperatively with the upholstered furniture industry in a commendable voluntary effort on their part to improve the cigarette-resistance of sofas and chairs. This voluntary program involves manufacturers, distributors, and retailers through the Upholstered Furniture Action Council (UFAC), in a joint effort to develop expertise to prevent furniture from igniting when a cigarette is left to smolder. That industry's track record has been sufficiently noteworthy that the CPSC has deferred issuing a mandatory flammability standard. We monitor this program by conducting independent checks to insure that progress continues apace.

But even if these and related industry efforts were to show 100 percent success rates—and it's a far cry from that at this point—the net safety gain could be prospective only. Such progress will at best affect future production by making new upholstered furniture more fire-resistant. Or put another way, it will have no effect on

the tens of millions of stuffed sofas and chairs now in peoples' homes, many of which will be there for another 10 to 30 years.

By contrast, changing the makeup or design of cigarettes to reduce the long burn would impact on all furniture—new and old—to be bought for, and already in homes and institutions across the country. The development of fire-safe cigarettes would mean that Americans reap safety benefits now, immediately, and would not have to wait several decades or more until existing furniture is replaced with safer furniture.

WHAT THE CPSC COULD DO

The proposed Cigarette Safety Act, S. 51, makes clear that it's time for government and industry to act. It calls for the CPSC to develop performance standards to reduce the unreasonable risk of injury from cigarette ignitions. To date, no governmental entity has had clear jurisdiction even to explore whether such standards are possible. Yet, this bill does not set guns ablazing in developing a mandatory standard. It affords all affected parties, the tobacco industry among them, a lengthy rulemaking period and ample procedural safeguards for due process and an opportunity to be heard. And, should a standard be developed, it will be based on objective studies, including research conducted by an august and respected scientific body, the National Bureau of Standards.

Should this proposal for whatever reason prove unacceptable, then at a minimum, the constant toll of pain, death and economic loss from cigarette fires suggests the need for a congressionally mandated study. Such a study would provide Congress with detailed information to make future decisions on dealing with this fire crisis. It would insure rigorous public scrutiny and debate. And, by carrying Congress, imprimatur, the cigarette fire issue would be deservedly earmarked as a pressing public safety concern.

While reviewing the feasibility of producing fire-safe cigarettes—that is, cigarettes with a lower propensity to ignite furniture and bedding or which go out within a few minutes—the study need not aim for zero risk. Rather than focusing on eliminating all cigarette ignitions, research could be directed toward reducing smolding cigarette fires within the limits of technical and economic practicability. The study would benefit from the involvement of numerous interested parties, including the tobacco industry itself. It could analyze the potential costs and benefits to this industry, and other affected industries, of a fire-safe cigarette. It could assess the safety and health consequences to individuals and to society from a fire-safe cigarette. Ideally, it could point up possible performance criteria for a fire-safe cigarette.

Who should conduct such a study? I can assure this committee that given adequate resources for the task, the Consumer Product Safety Commission would carry out Congress mandate in a thorough, professional and objective manner. But it is less important that the CPSC gets the congressional nod than it is that a responsible effort commence—as soon as possible. With a congressionally defined agenda and a short time frame for a report, such a study would go a long way in definitively addressing and reducing cigarette-ignition fires.

ACTION NEEDED

Whether the momentum to address these fires takes the form of a standards effort or a study, it is imperative to start the process as soon as possible. We need to review differing cigarette configurations which may be fire-safe. Experiments, using national brands, have shown that just putting less tobacco in a cigarette, thereby reducing available fuel, can lessen the ignition risk. It may also speed up the burning rate, thus reducing the time the hot, glowing edge or fire-front of the cigarette dwells on any vulnerable surface of furniture or bedding. Tests further suggest that something as simple as a smaller diameter cigarette lessens the potential ignition risk by cutting back the contact area between cigarette and surface. Smaller diameter cigarettes already tested have been densely packed and apparently used nonporous paper. These additional factors also seem to reduce ignition risk.

Use of filters may merit analysis too. Tests to date note a momentary intense period of heat when the fire-front moves toward the butt end of a nonfilter cigarette. During this brief period, the fire-front receives air from both the cigarette's front and back ends, and flares. Filters inhibit this. And finally, two other factors should be studied—removing chemicals from the cigarette paper and adjusting the composition of the tobacco blend may both reduce the long burn and thus the ignition hazard.

If performance standards are established, the rest will be up to the tobacco industry. Standards, whether voluntary or mandatory, are likely to specify that a ciga-

rette go out within a few minutes if left unsmoked or otherwise lessen the ignition hazard. Until now, at various times the industry has claimed that such a cigarette will be costly, foul-tasting, inconvenient, high in tar and nicotine, or more likely to produce cancer. This conclusion is difficult to accept from a sophisticated industry which—despite 1982 sales of $21 billion and advertising outlays around $1 billion—has spent barely a pittance on the ignition problem, and then only in helping the furniture industry to make its product more cigarette-resistant.

CONCLUSION

I wonder whether there has ever been a systematic analysis by the tobacco industry of the several brands of today's cigarettes which inadvertently lessen ignition risk. If these cigarettes exist virtually by chance, just imagine what wonders might be wrought if this industry applied its genius to the problem at hand. I can't believe that the very same tobacco industry which gave us the marvel of low-tar, low-nicotine cigarettes can't now present us with a cigarette that simply is less likely to ignite furniture or bedding.

One can speculate that the tobacco industry's lack of interest is based on economic concerns. Perhaps it is concerned about possible liability suits which might flow from acknowledging even some responsibility for working toward a resolution of this tragic problem. Yet tobacco companies are potentially liable right now if a cigarette causes a fire, and any lessening of risk would reduce the likelihood of suit. Or, perhaps the industry is anxious about possible lost sales from smokers relighting used butts should the cigarette be reduced to a short burn. Yet it's well known that relit cigarettes tend to lose freshness and taste stale. Neither concern can justify smugness about the continued awesome toll of injury, death and destruction.

I really can't understand the industry's utter failure to do everything in its power to reduce the increasing number of cigarette fires. Obviously the product liability laws aren't working as a deterrent to today's practice of producing the long-burning butt. When sued, the tobacco companies aver something to the effect that cigarettes don't kill, careless smokers do. And all the while the toll mounts. Elderly citizens—and thousands of other Americans—continue to die or are physically and emotionally scarred by cigarette fires.

I urge the tobacco industry to end this senseless situation. Let each of the tobacco leaders—Philip Morris, R. J. Reynolds, Brown & Williamson, American Tobacco Co., Lorillard, and the Liggett Group—take up the challenge and assume a leadership role in developing a fire-safe cigarette. If one of these companies would step forward and commit its considerable expertise and resources, I am confident that such a cigarette would be on the market shortly. For anyone, it should be less a matter of technology than resolve to come up with a fire-safe cigarette aimed at averting needless death and injury. If just one company would seize the initiative, as a society—old and young, smoker and nonsmoker—we'd be a heckuva lot safer.

Chairman HEINZ. Dr. Press.

STATEMENT OF EDWARD PRESS, M.D., M.P.H., PORTLAND, OREG., REPRESENTING THE AMERICAN ASSOCIATION OF PUBLIC HEALTH PHYSICIANS

Dr. PRESS. Mr. Chairman, many of the things that I plan to say have already been said so I may abbreviate my testimony a bit and the stenotypist might want to be mindful of that.

My name is Dr. Edward Press and I represent the American Association of Public Health Physicians. I have been interested and active in accident prevention work for many, many years.

I am also the author of a resolution that the American Medical Association passed, which calls on them to continue their support of the concept of a study to determine the feasibility and practicability of establishing a standard for self-extinguishing cigarettes and requiring cigarette manufacturers to meet that standard. That has already been discussed here.

The resolution also calls for objective studies to develop standards for cigarettes that will self-extinguish within a designated period of time or to meet some other performance standard to

insure that they will be less likely or will not ignite upholstered furniture or mattresses.

Now, physicians in general have been increasing their emphasis on prevention. The American Medical Association's 1982 president made that part of his keynote speech. Unfortunately neither the physicians, nor the Government, nor the tobacco industry, are doing everything that we could. I think we all share the blame. We are not doing what we can to prevent thousands of senseless fires that kill and maim so many of our citizens. Physicians see these citizens all the time. We just cannot afford to let it go on any longer. I think that is undue procrastination.

From the medical perspective, the elderly, as you already know, are frequent victims. When they are victims they cannot heal as well because their skin is thinner; they also contract complicating diseases. For those over 60 years of age, half of them will die if they get a burn over 20 percent of their body surface, whereas a young, vigorous man like our chairman here, could withstand 65 to 70 percent of his surface area being burned before half would die. The elderly get it in the neck in a lot of ways, and one way is if they get burned, they do not survive nearly as well.

At the present time, many tobacco companies add chemicals primarily to the cigarette paper rather than to the rest of the cigarette to make it burn a little faster or to burn at the same rate that the tobacco does. The rate of smoldering varies due to a few factors. For example, some of them are listed on the exhibit. They include the diameter, that is, if it is oval or circular or bigger or larger. If you pack the tobacco with a lot of density, if you decrease the amount of tobacco, if you add sodium citrate or other chemicals, if the paper is more or less porous; all these things affect the speed of burning and the heat with which it smolders, and so, in all likelihood, its ability to ignite furniture and other substances.

"FIRE-SAFE" CIGARETTE CHARACTERISTICS

EFFECTIVE FILTER

VENTILATION

SMALL DIAMETER

LOWER PACKING DENSITY

DECREASED ADDITIVES

PAPER POROSITY

BOTTOM LINE:
LOWER IGNITION POTENTIAL

There already are, as you heard before, cigarettes with differing degrees of ability to light fires in mattresses and furniture and even forest fires, for that matter. This difference in ignition potential has been a coincidental byproduct, and what we need is an organized study, as you heard before. The study should be done, as was mentioned, by a nationally recognized, scientifically respected agency. That agency should have available to it, either directly or by contract, the ability to manufacture different kinds of cigarettes with different specifications, so you would have ones that would and would not be likely to start fires. It should have a testing laboratory. The National Bureau of Standards does have a testing laboratory, and the U.S. Department of Agriculture has manufacturing facilities. One possibility would be to have either the Consumer Product Safety Commission, which is so ably represented here today, or perhaps the National Academy of Science contract with those two agencies that I just mentioned or with some other agencies.

But I want to tell you in closing why I think it is urgent that we begin such a study and you have heard this from other sources. The tobacco industry claims that the technology does not exist completely, although I believe now they are in favor of a study.

Mr. Chairman, you have heard from some of these witnesses who think the technology is available at present. I personally conducted some tests of my own and I found that some brands of the currently manufactured cigarettes, in addition to the two mentioned, are less likely to start fires than others.

A study should be able to determine why they are less likely to start fires. The study should be able to lead to making all of the cigarettes less likely to start fires. We have argued about this long enough, in my opinion. There are basic disagreements that will not be solved without further exploration of the issues. Until your committee, Mr. Chairman, and Congress as a whole, begins to gather its own data and starts to learn some of the answers to these disputes. I am afraid we are going to remain deadlocked. Such a study and action are long overdue.

If you want to protect the elderly and the general population as well from such frequent tragedies, I would recommend the passage of legislation requiring such a study promptly and the implementation of the findings of that study.

Chairman HEINZ. Dr. Press, thank you very much.

The last witness on this panel is John Rupp, who represents the Tobacco Institute.

STATEMENT OF JOHN P. RUPP, PARTNER, COVINGTON & BURLING, WASHINGTON, D.C., REPRESENTING THE TOBACCO INSTITUTE

Mr. RUPP. Mr. Chairman, my name is John Rupp and I do represent the Tobacco Institute.

The stated focus of these hearings—"Home Fire Deaths: A Preventable Tragedy"—is both timely and apt, in our view.

Although the causes of this tragedy are many and complex, the occurrence of accidental fires clearly is not unavoidable, as you have heard from all the witnesses who have appeared today.

The particular concern of the tobacco industry is, of course, that part of the accidental fire problem which involves carelessly handled cigarettes. There has been a good deal of public debate during the past couple of years about cigarette-related fires, and especially about the so-called "self-extinguishing" cigarette. Unfortunately, much of that debate has been uninformed, and sadly so.

Legislative proposals to alter the cigarette have conveyed and have rested upon a fundamental misapprehension, Mr. Chairman, that acceptable technology is available to reduce the ignition potential of cigarettes. In fact, despite substantial and continuing efforts on the part of tobacco company scientists and others, the desired technology is not available. Indeed, there is not yet even a consensus on the fundamental question of what characteristics the ideal fire-safe cigarette ought to have. I have attached to my written statement a detailed analysis of the pertinent technical and scientific questions and would be pleased to respond to any questions that you might have in that area.

Despite the many problems posed by cigarette modification, and in view of the substantial misinformation that exists in this area, the tobacco industry has proposed formally to Representative Moakley—who has sponsored fire-safe cigarette legislation in the House—a Federal study bill that would focus on the cigarette. The approach that we have suggested would draw on all available expertise from the tobacco industry and within the Federal Government. We believe that such a study would be an important adjunct to the industry's overall fire prevention efforts.

In the few minutes that remain to me, Mr. Chairman, I would like to describe some of the major fire prevention education programs that have been undertaken by the Tobacco Institute. These are in addition to the cigarette-related research that is being pursued by the individual tobacco companies. The accidental fire picture in Europe is much better than in the United States. In fact, many countries have only one-fifth the number of accidental fires the United States does. We asked Phillip Schaenman, formerly the associate administrator of the U.S. Fire Administration in charge of the National Fire Data Center, to investigate reasons for the differences. What Mr. Schaenman found was that the European countries, such as Switzerland, that have been most successful in reducing the number of accidental fires and fire deaths have focused on a broad range of measures—fire prevention education, code enforcement, inspection programs, and insurance incentives—that acknowledge the complexity of the accidental fire problem. After consulting with Mr. Schaenman and others, the Tobacco Institute has initiated a broad-based attack on accidental fires and particularly the subset of that problem thought to involve cigarettes.

The institute's attack has proceeded on two parallel fronts. First, we have witnessed in this country over the past 4 years more than a 20-percent decline in the number of accidental fires attributed to cigarettes. In an effort to accelerate that reduction, we have been working with other concerned industries such as the upholstered furniture industry. The most exciting aspect of this work has been the development and evaluation of substances that reduce or eliminate the possibility of ignition when sprayed on upholstered furni-

ture, carpeting, bedding, or draperies. We plan to continue this work in the coming months.

Our second area of concentration has involved the firefighting community directly. For example, we have designed and implemented a program that is helping the fire departments in a number of major cities in this country do a better and more thorough job of educating the public about firesafety and fire-safety practices. After working with fire-department personnel in those cities to identify fire-prevention education needs, we have provided needed materials and supplies. We presently are in the process of expanding that program to other cities.

We also have helped fund the development of a high school curriculum on fire safety that has been tested successfully in the State of New York and soon will be made available nationally.

In addition, we are working with the National Volunteer Fire Council. The great majority of American communities are protected by volunteer firefighters. Public response to their fund-raising and recruiting needs obviously is essential. To help in those areas, the Tobacco Institute has created a complete array of creative materials for use in all media.

This brief report would not be complete, Mr. Chairman, without mentioning one other area of activity. Despite the great strides that have been made during the past few years, one-third of all American homes, as you have heard, still are not equipped with smoke detectors or other fire alarm systems. And those important and effective devices, just as important, too often are not properly located or maintained. To help solve those problems we have been working with the National Fire Protection Association, from whom you heard this morning, on the design of model smoke detector programs that can be implemented successfully at the local level.

The tobacco industry is committed to the programs I have described, Mr. Chairman. We are convinced that private initiatives such as these can lead to the solutions we all seek to the problem of accidental fires, including those involving cigarettes.

I would be happy to respond to any questions that you may have, Mr. Chairman.

Chairman HEINZ. Thank you very much, Mr. Rupp. Your prepared statement will be entered into the record at this point.

[The prepared statement of Mr. Rupp follows:]

PREPARED STATEMENT OF JOHN P. RUPP

Mr. Chairman and members, my name is John P. Rupp and I represent the Tobacco Institute, an association of tobacco manufacturers with headquarters in Washington, D.C. We appreciate the opportunity that you have afforded us to participate in these important hearings.

The stated focus of these hearings—"Home Fire Deaths: A Preventable Tragedy"—is both timely and apt. For too long, the United States has led the industrialized world in fire deaths per capita. Although the causes of this tragedy are many and complex, and the occurrence of accidental fires—unlike, at least to some extent, the aging process—is not inevitable or unavoidable. We believe that these hearings can and should underscore the preventable nature of accidental fires and their often tragic consequences.

The particular concern of the tobacco industry is, of course, that part of the accidental fire problem that involves carelessly handled cigarettes. There has been a good deal of public debate during the past couple of years about cigarette-related

fires—and especially about the so-called "self-extinguishing" cigarette. Unfortunately, much of that debate has been uninformed. What I would like to do, Mr. Chairman, is attempt to place cigarette-related fires in an appropriate context, describe the tobacco industry's efforts in this area, and offer some recommendations for the committee's consideration.

Although one can speak with reasonable assurance about the overall number of accidental fires, dividing that total by cause involves a high degree of speculation. The reasons are not difficult to define. The kind and magnitude of damage often associated with accidental fires can preclude a reliable after-the-fact reconstruction of events. At the same time, fire department personnel often are under tremendous pressure to identify immediately the "cause" of individual fires. Much of that pressure comes, of course, from the media—wanting an immediate explanation for a particular fire, to be included in that evening's newscast or in the next day's newspaper. In addition, precious few resources are devoted in this country to the difficult job of fire investigation or to the task of fire prevention. Consequently, the statistics that are available on the causes of accidental fires involve a very substantial, built-in margin of error.

Nevertheless, the tobacco industry long has been concerned about the part of the accidental fire problem—however large or small it may be—involving carelessly handled cigarettes. Even more importantly, very significant and increasingly successful efforts have been mounted to deal with this problem. In fact, according to the available national data, cigarette-related fires have declined by over 20 percent during the past 4 years, while the number of fires attributed to certain other factors—such as home heating equipment—has increased several fold. I would like to describe, if I may, some of the more important aspects of the tobacco industry's fire program.

Because the accidental fire picture in Europe is so much better than in the United States, we asked Philip Schaenman—formerly the associate administrator of the U.S. Fire Administration in charge of the National Fire Data Center—to investigate reasons for the differences. During hearings before a House subcommittee in March of this year, Mr. Schaenman explained the focus of his investigation as follows:

"Why do Europeans have lower fire incidence and death rates? They smoke about as much as we do, and their cigarettes are not self-extinguishing. They heat and they cook, often on older appliances and systems. Their electrical systems are higher voltage and inherently more dangerous. They have many older buildings."

Our hope, of course, was that Mr. Schaenman's investigation would uncover fire prevention practices being utilized successfully in Europe that could be adapted and used in this country.

What Mr. Schaenman found was that the European countries, such as Switzerland, that have been most successful in reducing the number of accidental fires have focused squarely on fire prevention and have avoided single-shot approaches to the fire problem. As Mr. Schaenman explained during the hearings that I mentioned earlier:

"The problem of fires in the United States requires such a comprehensive approach. Europe has already reached the level of safety we set as our goal to reach in a generation, and they have done it without doing anything exotic. We could do the same, and not have to wait several years for new programs to be developed. The necessary legislative mandate already exists in the charters of the U.S. Fire Administration and the National Bureau of Standards."

Among the specific programmatic efforts recommended by Mr. Schaenman as a result of his work in Europe were (1) development of public awareness and education programs on safety practices, on a nationwide scale; (2) increased use and maintenance of smoke detectors and other fire safety devices; (3) strengthened building fire codes and rigorous enforcement by those responsible; (4) improved training and protective equipment for firefighters; and (5) continued refinement of fire statistics so that the overall goal of fire prevention can be better understood and addressed. Because of the importance of Mr. Schaenman's work, and its obvious pertinence to these hearings, I would be happy to make copies of Mr. Schaenman's complete study report available to members of the committee.[1]

While the individual tobacco companies have continued to search for ways to reduce the cigarette's ignition potential, the Tobacco Institute--with the full support and cooperation of the cigarette manufacturing companies—has initiated a broad-based attack on the accidental fire problem, and particularly that subset of

[1] Retained in committee files.

the problem thought to involve carelessly handled or dropped cigarettes. That attack has proceeded on two parallel fronts.

First, we have been working with other industries, such as the furniture industry, which have demonstrated a real interest in reducing accidental fires in this country. We have supported, to cite an example, the continuing efforts of the Upholstered Furniture Action Council ("UFAC") to reduce the flammability of upholstered furniture. This support has taken the form of grants as well as technical assistance. The testing that has been completed has confirmed the very substantial progress that has been made in this area.

In fact, Guilford Laboratories has conducted, at the request of the Tobacco Institute, tests on upholstered furniture complying with UFAC's phase I furniture flammability standards—furniture employing fabrics and construction methods being utilized in more than 50 percent of the new furniture being sold in this country as of early 1982. None of the furniture pieces in the Guilford tests ignited when a variety of cigarettes, representative of the U.S. cigarette market, were placed on them. Thus, as of the beginning of this past year, there was evidence that the modern American cigarette poses little if any ignition risk to a substantial portion of the furniture being manufactured in the United States.

The encouragement provided by the Guilford tests led us to increase our commitment to and support of UFAC's efforts. Several weeks ago, UFAC—with additional assistance from the tobacco industry—inaugurated phase II of its furniture flammability program. Phase II involves a number of refinements and other developments that are designed substantially to strengthen the UFAC program, including the incorporation in certain furniture of an aluminized, heat-dissipating welt cord.

Of even greater potential significance have been our cooperative efforts with UFAC to develop and evaluate substances that could be applied to furniture fabrics so as to decrease their vulnerability to ignition from an open flame or smoldering ignition source, including cigarettes. Although those efforts have been difficult and time-consuming, very substantial and encouraging progress has been made in this area. While additional testing and evaluation is needed, it now appears that substances may soon be available to manufacturers that would solve the open-flame and smoldering ignition problems presented by a range of household furnishings—including mattresses, carpeting and draperies, as well as upholstered furniture. We also are hopeful that, with some additional testing, these products can be made available to the consumer for use in the home, allowing consumers easy and inexpensive protection against the many ignition sources associated with residential fires. I can assure members of this committee that the tobacco industry's support in this area will continue.

I mentioned earlier that our attack on the accidental fire problem has been proceeding on two fronts, in addition to the cigarette research that I want to discuss in a moment. Our second area of concentration at the Tobacco Institute has involved the firefighting community directly. One of the primary lessons that we learned from Mr. Schaenman's study is that many European countries are doing a far better job of fire prevention and fire prevention education than we are doing in the United States. Our discussions with fire prevention specialists also convinced us of the importance of smoke detectors and other fire alarm systems in any effective fire prevention program.

Taking advantage of Mr. Schaenman's study and counsel, we have designed and implemented a program that is helping the fire departments of nine major cities in this country do a better and more thorough job of educating the public about fire safety. These cities are Seattle, Des Moines, Boston, New York City, Milwaukee, Chicago, Detroit, Baltimore, and Portland, Oreg. After working with fire department personnel in these cities to identify fire prevention education needs, we have provided needed material and supplies. We are monitoring the use that is made of these materials and supplies, assessing the extent to which they have enhanced the recipient cities' fire prevention efforts, and plan to make the results of that assessment available for the benefit of other cities and departments. We also are in the process of expanding this program to a number of other cities across the country.

We also have helped to fund the development of a high school fire safety curriculum that has been tested successfully in the State of New York. Our understanding is that this curriculum, and related materials, will be made available nationally through the National Fire Protection Association ("NFPA") as an adjunct to the NFPA's excellent learn-not-to-burn program, which previously had focused on the elementary school level.

In addition, we have been working with the National Volunteer Fire Council. The great majority of American communities are protected by volunteer firefighters. Public response to their fundraising and recruiting needs is crucial. To help in these

areas, the institute has prepared a complete array of creative materials for use in all media. This initiative has been designed to help volunteer departments attract committed volunteer personnel and raise funds to defray the cost of local firefighting and fire prevention efforts. Our experience with this program has been excellent and we certainly plan to continue it.

This brief report of the Tobacco Institute's fire prevention efforts would not be complete without mentioning one other area of activity. Despite the great strides that have been made in the last few years, one-third of all American homes still are not equipped with smoke detectors or other fire alarm systems—and those important and effective devices too often are not properly located or maintained. To help solve these problems, we have been working with the National Fire Protection Association on the design of model smoke detector programs that can be implemented successfully on the local level. We are now in the midst of phase I of that program, which is scheduled to be completed at the end of this year. Phase II, which should begin shortly after the first of next year, will involve field testing in selected cities. This is an ambitious program for any industry to undertake, but is one that we believe to be of great significance.

The tobacco industry is committed to the programs that I have described. We are convinced that private initiatives such as these can help lead to the solutions we all seek to the problem of accidental fires. We have continued to oppose, at the same time, efforts to legislate science into existence—that is, the enactment of laws that would require the production of "self-extinguishing" cigarettes.

Those legislative efforts have conveyed and rested upon a fundamental misapprehension—that technology is available to reduce the ignition potential of cigarettes and little cigars. In fact, despite substantial and continuing efforts on the part of tobacco company scientists and others over many years, the desired technology simply is not available. Indeed, there is not yet even a consensus on the fundamental question of what characteristics the ideal fire-safe cigarette ought to have. I have attached to this statement a copy of testimony by Dr. Alexander Spears, executive vice president for operations and research of Lorillard, before the House Subcommittee on Health and the Environment in March of this year. Dr. Spears dealt at length, and in detail, with the pertinent scientific questions and problems presented by proposals to modify the cigarette, and I would ask that Dr. Spears' statements be included in the record of these hearings.[1]

In view of the substantial misinformation concerning various proposals that have been made to alter the cigarette, the tobacco industry has proposed formally to Representative Moakley—who has sponsored "fire-safe" cigarette legislation in the House—a Federal study bill that would focus on the cigarette. The approach that we have suggested would draw on all available expertise from the tobacco industry and within the Federal Government. Those responsible for the study, which would be paid for largely by the tobacco industry itself, also would be authorized to consult with experts in the academic community as well as in the private sector generally—in order to permit a comprehensive investigation of the many scientific issues that are involved. We believe that such a study would be an important adjunct to the tobacco industry's overall fire prevention efforts. Meanwhile, the work of individual tobacco companies in this area is continuing.

Mr. Chairman, I hope that this statement has been responsive to the committee's invitation and will be of assistance as the committee considers the preventable tragedy of accidental fires. We would hope, in that connection, that Federal support of fire prevention efforts will continue and that funds will be found to continue the important work of the U.S. Fire Administration and the Center for Fire Research at the National Bureau of Standards.

I would be happy to answer any questions members of the committee may have.

Chairman HEINZ. My first question for the record is to clarify the tobacco industry position. Is my understanding correct that, prior to this year, you opposed any legislation in this area?

Mr. RUPP. That is not exactly correct, Mr. Chairman. We have opposed the legislation that has been introduced in the U.S. Senate and House over the past 3 years, which is legislation that would require immediately the setting of standards for cigarettes, because we do not believe those standards could be successful, and because

[1] See appendix, item 3.

we do not see any significant differences in the ignition potential of cigarettes.

We have proposed, however, that there be a Federal study in this area.

Chairman HEINZ. When did you propose that?

Mr. RUPP. We proposed an actual text of the bill within the last 3 or 4 months.

Chairman HEINZ. Prior to that time, when had you gone on record as supporting any kind of a study at all?

Mr. RUPP. I do not believe we have, and I do not believe there was an occasion, Mr. Chairman, to do so.

Chairman HEINZ. My understanding then, to repeat it, that up until this year, you have opposed any legislation and have supported none. Is that an accurate statement, based upon your knowledge of the situation?

Mr. RUPP. It may be only a subtle difference, but again——

Chairman HEINZ. You may differ, but again, do you know anything that would invalidate what I just said?

Mr. RUPP. It is not an answer that could be answered with a easy yes or no, Mr. Chairman. We have opposed specific pieces of legislation.

Chairman HEINZ. Therefore, up until this year, there has been no legislation that you have supported?

Mr. RUPP. We have not. That is correct. We have not proposed any legislation.

Chairman HEINZ. All right. That gives me the answer I want. I can see why you won six cases before the Supreme Court.

Let me ask our witnesses. Since the Tobacco Institute has seen the light, they are proposing a study. I am tempted to say they are willing to fight fire with fire, but that would be giving them an unfair hot foot.

What do each of you think about the merits and/or demerits of the Tobacco Institute's proposal as you understand it? Mr. McGuire?

Mr. MCGUIRE. My understanding of the proposal is based on reading what was presented to Congressman Moakley. So Mr. Rupp, is that the same proposal, because I cannot comment if it is not the same proposal?

Mr. RUPP. We have made only one specific proposal in writing, although since submitting that proposal to Congressman Moakley we have had several meetings with him and members of his staff to discuss issues, questions, alternatives. My understanding is that those discussions will continue and that alternative proposals will be made.

Mr. MCGUIRE. OK. Well, I will comment then on the proposal that was originally given, I believe in early April, to Congressman Moakley and Senator Cranston.

In that proposal, the major problem I saw was they wanted to preempt any State efforts in this area and in my testimony I think I made clear my view on that. We should not preempt State efforts.

Second, the proposal calls for a tobacco advisory group, I think it is 10 members from the tobacco industry that would get together and do the research and then come up with whatever the solution is. I will confess that last night I watched PBS, a 10-year reunion

with the Watergate hearings and there was the issue of whether or not the tapes should be given to Congress. President Nixon said that he could best assess whether or not those tapes were a problem. I view the tobacco advisory group of tobacco people coming up with a solution to this as being the same kind of thing. You do not let the people who have such a vested interest come up with a solution.

So on those two grounds, the preemption ground and letting them do the study, I totally disagree with their proposal and I think it is unreasonable.

Chairman HEINZ. What would you propose instead?

Mr. MCGUIRE. I would propose, as I mentioned earlier, that the National Bureau of Standards Center for Fire Research do the initial flammability testing, the criteria setting, and standard development. The Consumer Product Safety Commission and the National Institutes of Health should then enter into looking at the jurisdiction issues, the enforcement issues, the regulatory issues, and with NIH looking at any other health and fire issues that they would find interesting. Let the Government agencies do that and I think there should be a group of people who can oversee this research.

The last thing I would ever want to see is a 1, 2, or 3-year effort in Government agencies go down the tubes because no one is keeping track. I have already seen how the Tobacco Institute has sent members into the Center for Fire Research labs and has kept constant tabs on the research when it was going on initially a couple of years ago. I do not like that kind of interference going on. We have to have objective, unbiased, and unfettered research.

Chairman HEINZ. Thank you very much.

Chairman Steorts, what is your view on the proposal?

Ms. STEORTS. Chairman Heinz, I feel that it has to be a coordinated effort. I think the Government definitely needs to play a very strong role in this. I think the Consumer Product Safety Commission, if given this particular initiative from the Congress, could be the coordinator. I think the industry definitely has a role and I think that the consumer has a role. I frankly believe that we need a partnership in this important issue. I think the work the Consumer Product Safety Commission has done with the upholstered furniture industry could serve as a model for this program.

We are working with this industry today, Andy McGuire and I served on the Consumer Product Safety Commission National Committee on Flammable Fabrics a few years ago, and I have to tell you I would not have given the upholstered furniture industry a plug nickel for its success. Today, I am giving them compliments because 88 percent of that industry is involved in making the furniture more resistant to cigarettes.

Chairman HEINZ. If in another 20 years everybody throws away their couches and blankets, we may have the problem licked.

Ms. STEORTS. I am hoping that by the end of this year we will have the problem licked.

Chairman HEINZ. No, I do not mean in terms of the new ones. If everybody will throw away their antiques and other items in their homes, we will solve the problem.

Ms. STEORTS. That is why it is important to get to the other source, which is what you are doing.

But I do think the way we are working is important. Our technical people are working with the technical people of industry in a joint effort, and this is the key to the success of this program. I think coordinated efforts are the important ingredient in the work which the tobacco industry would do with the Government in this particular issue.

I also agree with Andy McGuire that you do need to have public sector overview and there are many outstanding experts in the overall fire area that I think could serve as a very important advisory group to this effort.

So I would see it as a joint partnership but I do think the Government has a very key role and I think the Government should be the catalyst in this issue.

Chairman HEINZ. Let me just be a little more specific. The Tobacco Institute has proposed that they do the study. They have built a number of safeguards into their proposal, but I have some problems with these safeguards because Congress would neither know nor be allowed to know the basis upon which any standards set were established, and because it is principally an industry group with a variety of secrecy agreements.

Does that part of their proposal cause you any problem?

Ms. STEORTS. Yes, it does. I think industry certainly has a role in this and I commend the tobacco industry for moving this, at least moving forward here to want to do a study in this area. I do think it needs to have the cooperation and participation of the experts from the Government, as well as the experts from the outside world in the public sector. I would not support the effort unless it had the cooperation and participation of the Government experts.

Chairman HEINZ. Another criticism of their proposal is that it is too broad, that it casts a very wide net by proposing a comprehensive study of the nature and extent of and the trends in accidental fires. Also, instead of focusing on the issue of whether or not there can be a fire-safe cigarette and, if so, what standards should be established, their proposal has broad-sided every conceivable target rather than focusing upon the specific problem.

Would you agree that that is a problem with their proposal?

Ms. STEORTS. Yes, I do agree it is a problem. I think it should be more specifically focused, and I think it should be focused on whether it is feasible to have a fire-safe cigarette. It takes a lot of scientific evidence and a lot of scientific research work to determine the feasibility, and that is what I think needs to be done first, and then you can look at the other factors.

Chairman HEINZ. One of the things you said in your testimony was that you welcome and support a study. I commend you for your support of such a study. I commend you on everything that you have testified to today. Let me ask you. Have you requested the authority to conduct such a study on any previous occasion?

Ms. STEORTS. The Commission has been involved in this process over many years. We have never had the jurisdiction and I do not think we have specifically requested the authority. If it were to be given to us, then we would need the adequate staff and resources to do it.

Chairman HEINZ. You agree that it is a problem.

I am advised, by the way, that the film we saw was from the California Bureau of Home Furnishings. I am sure you have been aware of its work in this area.

Ms. STEORTS. Yes.

Chairman HEINZ. Is there any reason why the Commission has not, on a previous occasion, requested authority to take action in this area? If indeed people are being killed, and they are; if indeed, as you have testified, cigarettes cause a very high proportion of residential deaths; if indeed, you have worked as you say you have with Mr. McGuire on previous occasions, why has not the Commission in any way, shape, or form come to the Congress? Have we not given you the opportunity? What is the problem?

Ms. STEORTS. Well, in our initial legislation, the cigarette was never included as one of the products that we would regulate. Betsy, I will let you speak on this from Commissioner Statler's viewpoint.

Chairman HEINZ. All right.

Ms. WILANSKY. Two things. First, the study. Since the Commission is on record over the past few years in support of the cigarette performance standard bills, which will require a research effort, it would seem by implication that the Commission has indicated its desire to be involved in a study. Second, there was an attempt made, I believe it was in 1974, in response to a petition to the Commission, to regulate cigarettes as a hazardous substance under the Hazardous Substance Act. This was met with industry dismay and ended in legislation making clear that cigarettes are items we cannot deal with under any of the statutes the Commission administers. So it is specifically barred under the CPSA and the other acts as well.

Chairman HEINZ. So Congress has not been very encouraging?

Ms. WILANSKY. No.

Chairman HEINZ. Yes?

Mr. MCGUIRE. I recently had a friend in Ann Arbor, Mich., go through the papers of Senator Phil Hart, which describe his effort in 1974 and 1975 to go after a fire-safe cigarette. Contained within these is the history of how the tobacco industry came in and took away jurisdiction over cigarettes from the Consumer Product Safety Commission.

Chairman HEINZ. Well, I think most Members are aware that jurisdiction certainly has not been given to the Commission. That does not mean the Commission cannot ask and has not asked for it. I just want to get the record straight.

What Betsy Wilansky is saying is that, in effect, you have asked for jurisdiction on previous occasions but Congress has turned a deaf ear so far.

Ms. STEORTS. Yes; and in our present reauthorization it was not brought up. And of course we have to heed very carefully to what our jurisdiction is. But I do think that if such a feasibility study would be presented to us and if CPSC seems to be the agency that you feel would do the best job, then I think it would be received very favorably by the Commission.

Chairman HEINZ. Ms. Wilansky, do you have anything to add to the critique of the tobacco industry bill or proposal?

Ms. WILANSKY. I think Andrew stated what would be Commissioner Statler's objection to the industry bill dealing with preemption and industry control as opposed to an industry and Government's cooperative effort. There are models for interagency cooperation for such an endeaver, such as the Interagency Regulatory Liaison Group a few years ago, which had five Government agencies coordinating efforts dealing with toxic chemicals.

What has not been mentioned, and I would imagine what Mr. Statler would like me to add, concerns the value of such a study. It would show a committed national effort to try to deal with this fire crisis and, obviously it would give Congress detailed information in order to make informed decisions.

Chairman HEINZ. I am going to temporarily skip over Dr. Press. I have one or two questions that I want to ask Mr. Rupp.

Mr. Rupp, you have heard what people would prefer as an approach here. What is wrong with the kind of interagency process described by Chairman Steorts that was used with the furniture manufacturing people? Why cannot the tobacco industry cooperate in that fashion? Why do you have to make it what one would refer to as an inside job?

Mr. RUPP. Well, I am not sure Chairman Steorts would say that, but I must say I do not know that I would disagree specifically with anything the Chairman has said. I find her comments to be most constructive.

The composition of a technical advisory group is still under discussion. That is not cast in stone.

On the issue of preemption, that issue strikes me as somewhat ironic. The proponents of self-extinguishing cigarette legislation in the States have described that effort as a way of forcing Congress to act in this area. We have proposed a Federal study, the contours of which are still under discussion, that we thought was what they would want, and to permit the chips to fall where they may. There have been charges and countercharges in this area and we believe that the time has come to get them all out in public view and have them tested in the scientific arena. We do not want to get ourselves into this position, because our scientific resources are limited, that once agreeing to, and indeed proposing a serious comprehensive Federal study of the scientific issues involved here, of having our scientific and other personnel sapped by a kind of guerilla warfare at the State level. This is a national situation, a national problem, and we believe it should be handled nationally.

If there are changes to be made——

Chairman HEINZ. Let us talk about a national approach for a minute, if I may.

One of the things you have said in your statement is that there is a public misapprehension that acceptable technology is available to reduce the ignition potential of cigarettes, and then you go on to say that desired technology is not available, despite substantial and continuing efforts on the part of tobacco company scientists, and so forth.

How much have the tobacco companies spent in research on this issue each year?

Mr. RUPP. I do not have that information nor do I believe that information can be accumulated.

Chairman HEINZ. On what, then, do you base the statement that there has been a substantial and continuing effort?

Mr. RUPP. Several things. One is that I have been in touch with—on a continuing basis—scientific personnel and other personnel from each of the companies over a number of years on this issue.

Chairman HEINZ. How many years?

Mr. RUPP. I have been involved in this issue for the past 4 years.

Chairman HEINZ. The past 4 years?

Mr. RUPP. Yes; the past 4 years.

Chairman HEINZ. When did you join Covington & Burling?

Mr. RUPP. Originally in 1972, but then I took time out to serve at the Justice Department from 1974 through 1977, returning to Covington in the spring of 1977.

Chairman HEINZ. And you have been involved with Covington & Burling since 1979?

Mr. RUPP. Essentially. I am satisfied that there are continuing and substantial efforts at each of the companies.

Chairman HEINZ. I am asking for documentation of that. You are a Washington person. You work at one of Washington's premier law firms. Most of the people who work as a partner at premier law firms are highly paid and are expert. You yourself have clerked for a very distinguished judge. But you are here as a representative of an industry. You are making a statement as their advocate. It is important that this committee understand the basis for your statement that there have been substantial efforts on the part of the tobacco company scientists.

Now, I understand that you have talked to them, but I still do not know where there has been a substantial effort, other than your word for it, that you have worked with them, they have talked to you and they have told you that they have engaged in actual measures.

Have you got anything hard to put on the record here? Do you know of any specific projects that have been pursued for an extended period of time in this area by specific companies or by the institute itself? Does the institute conduct any research in this area?

Mr. RUPP. The answer to the latter question is "no." The institute does not itself conduct scientific research in this area or engage in product research generally.

Let me answer the prior part of your question with a "yes," but delay for just a moment and point out some specific documents. Let me preface the pointing to specific documents with this.

Research and development in the tobacco industry, as in any industry in America as it goes on in individual companies, is a proprietary matter. It has to be in part because of the antitrust laws of the United States.

Now, what we have proposed is a Federal study in the area that would permit the turning over of precisely this kind of information with antitrust protections.

Chairman HEINZ. I understand that. You have made that clear.

Have any of the scientists who studied this matter at any of the tobacco companies published any papers in the area?

Mr. RUPP. Well, Dr. Spears has, and I have attached to my statement a rather full scientific exposition of this issue by Dr. Spears.

Chairman HEINZ. Where was that published?

Mr. RUPP. If you mean published in a journal, it was not. It was prepared and given several months ago to Congressman Waxman.

Chairman HEINZ. Here is what I am driving at. I come out of a related industry, a consumer industry. I was in the food business for many years. My great-grandfather helped lobby the Congress. He helped, I understand, draft some of the legislation that established the Food and Drug Administration back in the teens. That particular firm, for many years, has been quite active in encouraging its scientific employees to publish, and many of them have published, a variety of subjects dealing with food additives, nutrition, and so forth. Here is an industry, the tobacco industry, that is enormously profitable. It has the wherewithal to encourage such publication. But based on what you have told me, there has been no such publication encouraged or, if not encouraged, none forthcoming.

Mr. RUPP. Well, that is not quite correct.

Chairman HEINZ. In this area.

Mr. RUPP. No, that is still not correct.

Chairman HEINZ. All right, good. Tell me what has been published?

Mr. RUPP. There have been a number of publications over the years on specific aspects of the cigarette-burning process, the rate at which cigarettes burn, and the heat at which cigarettes burn.

Chairman HEINZ. Would you furnish the committee a list of those? [1]

Mr. RUPP. Yes, I can do that.

Chairman HEINZ. Very good. That would be helpful.

Mr. RUPP. I should say in addition that the Spears paper has been available now for a good long time and certainly is available for peer review if there is interest in doing it.

Chairman HEINZ. I have one or two more questions but I want to note the presence of Senator Pressler of South Dakota. Since I have taken almost my entire 5 minutes, at this point I would be delighted to yield to Senator Pressler for any comments or any questions that he may have at this point.

STATEMENT BY SENATOR LARRY PRESSLER

Senator PRESSLER. Thank you, Mr. Chairman. I shall be relatively brief. I am engaged in a Commerce Committee hearing this morning on telephone rates. I have raised the issue of telephone rates for the elderly because recently I was in Spearfish, S. Dak., talking about telephone rates and what is going to happen on January 1 when we lose our nationwide service as we have known it. Indeed, elderly people stay in touch with their children and grandchildren by phone, and this is a big issue. That is the effort which is under way this morning, so I do apologize for not being here the whole time.

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[1] See appendix, item 3.

I noted, and I hope I am not duplicating questions here, but I noted that volunteer fire departments were mentioned. In smaller towns and rural areas we depend entirely on volunteer fire departments. In terms of the statistics we see here, in terms of persons dying in residences and elderly persons being affected, is there a big difference in the protection afforded by a volunteer fire department versus a professional one? Does anybody here have a comment on that or a reaction?

Whose testimony mentioned the volunteer? I think John Rupp.

Mr. RUPP. Yes, Senator, I think I mentioned that as one of the programs that we are undertaking to support the volunteer fire effort. But I do not, I am sorry to say, have statistics that would tell you whether their efforts at this point are more or less effective than paid departments. It varies a good deal. Fires also vary geographically, that is, types of fires.

Ms. STEORTS. Senator, I am Nancy Steorts from the Consumer Product Safety Commission.

We work with both the volunteer and the professional fire departments throughout the United States. They have been tremendously helpful in gathering fire statistics for us. I would like to say that without them we would not have much of the good information that we do.

Mr. MCGUIRE. Andrew McGuire from San Francisco.

The volunteer fire service throughout the entire State of New York has spent the last 2 years lobbying very heavily in Albany, N.Y., for a fire-safe cigarette bill in the State of New York. I believe that efforts by the volunteer fire service are going to spread to other States because the volunteer fire service in New York and other States has recognized the cigarette problem. They came quite close to getting it through New York this past session. The bill cleared the assembly on 123 to 13 votes and then time ran out. The legislation did not get onto the floor of the senate in New York. But I believe the volunteer fire groups in the State of New York are the single main reason that it got that far.

Senator PRESSLER. I noted also in that same testimony that Europeans have lower fire incidents and death rates. Yet, they smoke about as much as we do, and their cigarettes are not self-extinguishing. They also heat and cook on older appliances and systems, and their electrical systems consist of higher voltage and are inherently more dangerous.

Mr. MCGUIRE. I would like to respond first if I may. That claim has been made by a person working on behalf of the Tobacco Institute. There are some problems that have been recognized with that claim which have since been entered into the Congressional Record. I do not have it with me, but I can get it for you.

First of all, no, Europeans do not smoke as much as we do. The United States leads the world in cigarette consumption. Canada is right up there with us. There are some European countries that have about one-half to one-third the consumption of cigarettes yearly that this country has.

A factor in why Europeans have fewer fires and fire deaths could very well be because of fewer cigarettes.

Second, we do not know how good the data is from Switzerland to Yugoslavia to Ireland, and whether or not it even compares with

the U.S. data. There is no standard form that all countries fill out and there is no standard investigation procedures from country to country. So when the Tobacco Institute starts making claims about what the fire rate is or the death rate is due to fire in Europe, I look at that as a red herring.

Mr. RUPP. Senator, if I may respond. That comment really does not make a great deal of sense to me. We know how many fire deaths occur. The fire death figure is a fairly hard figure. Breaking up those fires by cause involves a good deal more speculation. It is a good deal less subject to verification. But it is just a clear fact that the fire death rate in Europe is one-half the United States, and in a number of countries like Switzerland it is one-fifth. There are a number of lessons to be learned from that fact and Mr. Schaenman has done that work. Now he is not an employee of the Tobacco Institute. He simply asked for funding, and in this and other areas we provided funding because we believe it is an important area of inquiry. He has completed a report. That report has been subject to peer review and I certainly would be happy to provide it to your office if you would like it.

Senator PRESSLER. I wonder if any of you have a view. Is the problem we see in these charts greater in rural and small town areas? Have any of you any feeling for what is going on in the rural and small town areas as opposed to big cities?

Mr. MCGUIRE. I think that the best example would be what goes on in Alaska, which I think is clearly a rural State. Alaska has about two-thirds of its fire deaths attributed directly to the cigarette.

Senator PRESSLER. About two-thirds.

Mr. MCGUIRE. About two-thirds, rather than the normal one-third to one-half. I think that part of that is due to a slower response time by volunteer fire services.

I do know that in Alaska there is a connection between alcohol consumption and cigarette fires, and that may or may not be the same in other rural areas in this country. But Alaska, as the prime example, has a huge problem with fire deaths from cigarettes.

Ms. STEORTS. Senator Pressler, this is one of the reasons why the Consumer Product Safety Commission has stressed that it is important to have a smoke detector in every home. It is the early warning system; there is a problem and if a person is awakened, they can either get out of the home immediately or they can try to put the fire out if it is not too serious. Just recently, I was in the city of Syracuse, N.Y. The fire chief of Syracuse reported to me that they have not had one death reported from a fire where there was a smoke detector in that home. That is one of the reasons that we have the smoke detector program as a major priority for 1983. It needs particularly to be in the homes of the elderly and in rural America where they do not have the fast response from fire departments that we have in metropolitan cities.

That is one reason why in earlier comments to the chairman I said that we would very much appreciate the support of this committee on our smoke detector program, as well as on our program for the elderly, because it is extremely important.

Senator PRESSLER. How are you implementing the smoke detector program? If you explained it while I was not here, then do not go through it again. But briefly, how are we going to achieve it?

Ms. STEORTS. We are working very closely with every group that we can think of. We are getting tremendous support from the fire departments, from the local jurisdictions, the Governors, the mayors in our States. We are also working very closely with the industries and these groups to get the smoke detectors in the homes of the elderly and some of the low-income people that may not be able to afford smoke detectors. We have some very innovative programs that have already been initiated throughout the United States. As I told the chairman, I would like to provide for the record a complete compilation of what we have done thus far because it has been a great success.[1] However, we have a lot more to do.

Senator PRESSLER. I think those may be all the questions that I have to cover.

I want to commend the chairman for holding this hearing and also say that I am preparing a report on rural and small town problems that are unique to the elderly in these areas and I hope to have it completed by next January.

I want to thank the chairman for holding hearings or planning to hold hearings in Sioux Falls on the problems of the elderly as well as Alzheimer's disease and we will also be taking a look at that in an urban area, as I understand it. And later this year I will be holding my ninth annual senior citizens seminar in a small town to collect data and information.

I think the information that we are getting here today is most important. We are going to make a special effort to get the rural and small town aspects of it and how it will affect our elderly living in those areas. I thank the chairman very much for holding these hearings.

Chairman HEINZ. Well, I thank the Senator from South Dakota for his interest in these matters. I also want to thank him for his initiative in helping to organize and hold the hearings, particularly the one on the rural elderly that he just mentioned, in South Dakota.

Coming from the State with the largest rural population of any State in the Nation, Pennsylvania, I appreciate the Senator from South Dakota's effort. Statistically, there are 3¼ million rural citizens out of roughly 11½ million Pennsylvanians. So I expect your hearing, Senator, to be of immense value to my constituents, as well as to your constituents. I commend you and I thank you accordingly.

I have one or two other questions. Let me just finish up with Mr. Rupp.

Mr. Rupp, you say that the desired technology for making cigarettes more fire-safe is not available. Earlier I think you heard me read the guarantee on the inside cover of this box of Sherman cigarettes. It says that nothing has been added to these cigarettes and apparently, at least based on the research done by the California Bureau of Home Furnishings, they do not cause fires.

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[1] See letter in appendix, item 2. Supplemental material retained in committee files.

In his testimony, Dr. Press says on page 2, and I quote:

"At the present time, many tobacco companies add chemicals to the cigarette paper to make them burn more rapidly or at the same rate as the tobacco."

Is that true?

Mr. RUPP. A small amount of citrate salts are added to cigarette paper but the purpose is to even the burn so that the paper burns in synch with the tobacco. If you eliminated the citrate salts, the operational significance is about a 20-percent rate, you would not have anything close to a self-extinguishing cigarette.

As to the Sherman cigarette, the reason that they will go out in some circumstances is not because of the presence or absence of any additives, it is because they employ a heavy, densely-packed tobacco, much like a cigar tobacco and relatively nonporous paper. The effect of that, at the same time, the inevitable effect of it is to produce a product that is extremely high in tar and nicotine. The Sherman cigarette, the MCD variety that you have in your hand, yields between 36 and 54 milligrams of tar per cigarette. The industry average tar yield was 12.7 milligrams for the past year. And of course there are many down in the 1- and 2-milligram range. The Sherman cigarette is a specialty cigarette that is sold in New York and a few other places. It is so small that it is not one of the 200 varieties of cigarettes picked up by the Federal Trade Commission in their yearly analysis of cigarettes.

So there are some difficulties from the consumer acceptance and other standpoints.

The other thing that I would say about the Sherman cigarette is that the California Bureau of Home Furnishings certainly has not found that the Sherman cigarettes are fire-safe cigarettes. They nave found that in some circumstances the Sherman cigarette, as all other cigarettes, will go out even if the tobacco has not been consumed. The Sherman cigarette will tend to go out more rapidly than other commercial cigarettes. But that is not really the pivotal question—the question is not whether a cigarette will go out before it reaches the butt end, but whether the cigarette is less likely to start a fire. And it is because of this point that we do not believe there is any significant evidence that the Sherman cigarette is less likely to start a fire in the kind of fabrics that are presenting the preponderant kind of problem, which are heavyweight cellulose and cotton fabrics.

Chairman HEINZ. If I could summarize at least the first part of your testimony, you are saying that if a cigarette was made so that it will not burn you in bed, it will get you in the lungs, because it is going to have high tar and nicotine. That, I think, is what you just, in so many words, said.

Let me ask either Mr. McGuire or Dr. Press, does it have to be that way? If you design a cigarette so that it does not start fires, are you going to get more tar and nicotine, and as a result the diseases that I guess the Tobacco Institute claims do not exist, like lung cancer?

Are you saying, Mr. Rupp, that tar and nicotine are bad for you?

Mr. RUPP. No, I am not.

Chairman HEINZ. That is what I thought. I suspected as much. Thank you.

Mr. McGUIRE. That was my point. I find it humorous that that issue is even raised and the claim here is that Sherman's have 36 milligrams of tar or more. That was almost the standard 20 years ago in a lot of cigarettes like Camels and Pall Malls, and so on.

My feeling is that the only reason we are having hearings today is because some cigarettes have been shown at the National Bureau of Standards and at the California Bureau of Home Furnishings not to ignite most flammable worst-case furniture. We are not here because of some mythical idea that there is such a thing as a cigarette that would not cause a fire. We are here because the research has already started and has shown some profound differences between cigarettes.

When Gordon Diamant in California first looked at a variety of brands of cigarettes about 6 years ago, he found that indeed some cigarettes on the market self-extinguished. I think Chesterfields happened to be one of those at the time, after about 20 or 30 minutes.

The crucial point is that most fires start 3, 4, 5, 10 minutes after that cigarette is dropped.

Now, when Nat Sherman is placed on flammable furniture, it tends to go out in 2 or 3 minutes. Again, we are here today because we have a discrepancy on the way cigarettes start fires. The first time that was recognized, that discrepancy, was 51 years ago and Congresswoman Edith Norse Rogers of Massachusetts looked at the issue of what she described as self-extinguishing cigarettes. She instructed the Bureau of Standards in 1929 to look at how to make cigarettes so they would not cause fires. In 1932, the March 31 edition of the Boston Herald-American had an article quoting the Director of the Bureau of Standards saying that they had come up with a self-extinguishing cigarette and they were waiting for tobacco companies to take up the idea. That was 51 years ago.

Chairman HEINZ. Dr. Press.

Dr. PRESS. Thank you, Mr. Chairman. I have been impatiently waiting here. I have an idea that might be able to convert what amounts to an adversary procedure against the Tobacco Institute into turning them into an advocate.

Chairman HEINZ. Well, I think we are getting very close to agreement here.

Dr. PRESS. That is why I think this will facilitate agreement.

Chairman HEINZ. I am troubled by the fact that the Tobacco Institute, in its written testimony, maintains that although they support a study, they say the desired technology is not available.

Dr. PRESS. Exactly.

Chairman HEINZ. They say they cannot do anything to reduce the ignition potential of cigarettes. This has become an adversary proceeding in the sense that there are three or four people to the left of the institute here at the table who disagree, I think, and rather strongly so.

There is a bone of contention.

Dr. PRESS. I understand that and I am going to try to clarify that for you.

If what we are saying now, for the moment I am putting myself in an adversary position with Mr. Rupp, that we want to get a fire-safe cigarette, then I think he is right. I do not think they have the

current technical ability to get a cigarette that will be absolutely safe from starting fires. I think if you change that word from a fire-safe to a fire-resistant cigarette, then you are going to get some place. Then I think we can get their cooperation and I think we can get Congress cooperation.

What we need to do is not wait until the study shows that you have got a cigarette that is not going to start fires in upholstered furniture, for example. What we need to do is to take the current cigarettes that we have, and find out which ones of them start the least number of fires whether it is a More or the Carlton or the Sherman. What are the characteristics of those cigarettes that do it, use a technical advisory committee from the Tobacco Institute but make sure they stay advisory, so that they do not direct or control the study. Set the study up, give it a specific time limit, do not use the study as a procrastination device which I have seen so frequently. Say within 12 to 18 months, we want you to come up with standards that will start a lower percentage of fires than what we have now, use graded standards.

You do not have to come up with a standard that is going to be perfect and is going to last for 5 or 10 years.

When I was interested in other standards, for example the automobile standards, at the beginning we wanted dual brake cylinders, we wanted shoulder restraints as well as lap restraints. We wanted a series of things, but we started off with lap belts first and then later on shoulder restraints and then head supports.

I think what you need to do is tell either the consumer or the manufacturer that we need a study—and I think it ought to be the consumer—I do not think, obviously, that the Tobacco Institute should do the study. I do think you can use and you need their technical ability to help you with it. Have the CPSC or the National Academy of Science or somebody set the study up, tell them to develop the standards. Use the latest state of the art that you now have. Maybe you cannot eliminate but only reduce it, that is, maybe you can only get the cigarettes 30 percent safer than the current ones, but find out what is practical for the manufacturers to do now. They will go with it if they do not think it is a sales deterrent and I do not think it will be a sales deterrent. If you say to them, not just a Sherman, because they do not like the Shermans at all, there is a strong enmity there. But say, here are two or three other brands besides the Sherman that are 30 percent less likely to start fires. These are the characteristics that may need to be varied—the density, if it is oval instead of circular, or the paper is more porous, or whatever it is. Do not worry too much about the tar and nicotine. You might have to worry about the taste a little, because if it tastes bad and does not sell, then they will not want it, and people will bootleg cigarettes from Canada and Mexico. But take the lower 30 percent, that is, those that start 30 percent less fires. This is the standard, do not give them much time, 12 or 18 months, and then when that standard is finished, CPSC will require it. And within another 12 to 18 months, all of the companies will have to manufacture cigarettes to those standards.

Then 3 or 4 years later, you can raise the standard from 30 percent less fires to 50 or 60 percent less. You will never get a 100

percent fire-safe cigarette. Maybe you ought to change the name to fire resistant. I think they will go along with that.

If they do not go along with that, "hold their feet to the fire," until they do.

Chairman HEINZ. Let us ask them.

Mr. Rupp, would the tobacco industry and the Tobacco Institute support a bill that mandated a study of the feasibility of establishing standards for a fire-resistant or a more fire-resistant cigarette which provided for, among other things, an interagency task force as has been suggested by several other people as part and parcel of the method of such a study?

Mr. RUPP. Responding precisely, as you stated it, the answer is "no."

What we will support and what we have proposed is a Federal study to determine whether it is possible to produce a cigarette that is safe.

Chairman HEINZ. I know what you propose. Tell me what you do not like about what I just said.

Mr. RUPP. The setting of standards. If we can come up, or some other group can come up with a cigarette that is safer than——

Chairman HEINZ. Can I draw your attention to a very key word that I purposely inserted in my statement, which is "feasibility." A mandate to study the feasibility of setting standards for a fire-resistant cigarette was the very specific mandate that I expressed. It was not a mandate to set a standard, although I would hope that it would prove to be feasible to do that as well. But I think it is important to know whether it is feasible to set standards before they are actually established.

Mr. RUPP. Well, maybe I am having semantic problems with what you say.

Our position is that if we or someone else can come up with a cigarette that is safer than the cigarettes that are presently on the market, there will be no need for standards, whether imposed, whether on the State level or the Federal level. Our companies will move to implement those advances in technology.

We have said that repeatedly, that continues to be the industry's position. If we can come up with a cigarette that is significantly safer than the cigarettes presently on the market, I am satisfied that that cigarette will be the cigarette you would see on the shelves. The differece we have here, and it is reasonably fundamental, is that we do not believe there is any significant difference in the ignition potential of the cigarettes presently on the market. The position of the individual companies at this point is that they do not know how to make a safer cigarette from a fire perspective.

We have proposed a study that would seek to advance the available technology, hoping that the synergistic effect of people brought in from a variety of different disciplines, from a variety of different companies, who have been unable independently to make that technological breakthrough, would be able together to do so.

Dr. PRESS. John, do you really think that every cigarette that is manufactured has approximately the same propensity to ignite fires? Do you disagree that some have a little less and some others have a little more?

Mr. RUPP. The problem, Ed, is that there is such enormous variability in the fabrics, in the environmental conditions, draft, humidity, and so forth.

Chairman HEINZ. Dr. Press, do you have a further comment?

Dr. PRESS. Well, he is right to a certain extent that none of the cigarettes are fire safe. I agree there. But if John says that they all have approximately the same propensity to start fires, I disagree. I myself have put two or three different cigarettes on the same piece of upholstery and found that some started fires while others did not. It is true it was an older piece of upholstery, but there was a difference between different brands of cigarettes, under similar conditions. This was not a highly scientific thing, but I think it would stand up. I did it on two different kinds of furniture and found that some cigarettes burned faster than others and started more fires. I do not know whether that is the rate of burning only, but any way, on that piece of furniture, and it was not cotton batting only, but was just a regular piece of furniture that I went down and bought in a secondhand furniture store. I tested two or three different brands of cigarettes, and some of them started fires and some of them did not, on that same piece of furniture.

So I think there is a range of ability to start fires. Now, I am not sure what the range is, but I think a scientific study could determine the range and can say these characteristics are 20 percent or 10 percent or 30 percent less likely to start fires. And then you could determine the state of the art. Let us make them perform up to this part and then 2 years later it may be better.

Chairman HEINZ. Let me ask either Chairman Steorts or Mr. McGuire whether some work has been done in this area? There was a film a minute ago that showed that some work is being done.

What do you understand to be the facts?

Mr. MCGUIRE. The National Bureau of Standards' Center for Fire Research has placed Sherman filter tips, Mores, Carltons, Viceroys, and Pall Malls, to test flammability, on flammable cotton with polyurethane foam. The More ignited one out of the five, and the Carlton ignited two out of the five, while the Pall Mall and the Viceroy were fire hazards. That was done many times in a controlled atmosphere, with controlled humidity, and so forth, and standard procedures were developed.

Chairman HEINZ. Chairman Steorts, are you aware of the same tests?

Ms. STEORTS. Yes, I am.

Chairman HEINZ. Do you believe that they prove that there are in fact differences?

Ms. STEORTS. I think there are differences.

Chairman Heinz, I must tell you I am aghast at the fact that an industry would not want to be a part of bringing together the best minds of this country to look at the feasibility of whether there could be a cigarette that could be safer for the American consumer. The Consumer Product Safety Commission works every day with industries which want to work to bring about safer products for the American consumer. I would like to say that there are many models that have worked very successfully for us. I think your proposal is an excellent one. I think that there needs to be a catalyst, an interagency catalyst, where we can bring the best minds in the

country together from both the public and private sectors. I must tell you I am really amazed at the tobacco industry, that they would not join in such a positive proposal.

Chairman HEINZ. Thank you. Well, maybe it is a semantic difference, but Mr. Rupp said he would not support the proposal I made as he understood it.

Mr. RUPP. As precisely formulated. We will support——

Chairman HEINZ. It was also carefully formulated. I have to say that, considering Dr. Press' comments, that sometimes there is an adversarial relationship between the tobacco industry and others, and that the tobacco industry is its own worst enemy at times. It manages to score, in my opinion, one public relations disaster after another because it appears to be blind to the facts or it does not hear what is being said about it.

Now, I understand Mr. Rupp's position. He is here as an advocate and it is his job to represent his clients as well as he can. He has done a good job. But in doing a good job of arguing what before a court would be the best possible defense of, in my judgment, an untenable position, I think that the industry does itself more harm than good. We are not only talking about legalities, we are talking of public interest. We are talking about changing the law, giving the appropriate mandate to people who have, I think, an enlightened view of the public interest first and foremost in their minds. That is what the Consumer Product Safety Commission is supposed to do.

I have no further questions.

I want to thank all five of our distinguished witnesses for their comments. It does appear to me, notwithstanding Mr. Rupp's comments, that while he may quibble about some of the words, there is agreement among all five of you that there should be a mandate for a study.

Mr. RUPP. Correct.

Senator HEINZ. We, or at least the tobacco industry may continue to quibble about the details, but let me say that if you quibble about details that really are minor in the scheme of things, then the charge many people make that the tobacco industry has no interest other then self-interest will be much more fully substantiated than I would ever like to see happen to any industry. I do not think that that is a good image for the companies that compose the institute. I do not think, as a former businessman, that that is a good image for one group of businesses to develop, because it rubs off on all businesses. I personally do not like it, I do not subscribe to it, and I suggest that the industry hurts all American businesses when it becomes paranoid and just says no, no, no, pointing out that the fine print is not exactly what they want.

Mr. RUPP. Senator, if I may make a point.

I am not sure what has motivated all of this. To make our position absolutely clear. I think we are in agreement 99.9 percent of the way——

Chairman HEINZ. Well, we would be in a lot more agreement, and let us let it rest at this, if in your statement you did not say things that you cannot substantiate. All right: (*a*) You say there is a lot of research being done, but you do not know how much. What has been paid for, you do not know.

(*b*) You say that there is no difference among cigarettes. Yet, here are a number of cigarettes that are different.

(*c*) You say there is no technology available.

There are a variety of variables that are controllable: Variables that affect the filter, ventilation, diameter, packaging density, decreased additives, and paper porosity. Frankly, I must tell you that when someone says there are no controllable variables, and there are about one-half dozen sitting in front of you all day, and you have not referred to them as controllable variables, I do not think that that shows much appreciation for the intelligence of the Congress. I have some problems with your testimony. I find it incredible.

Mr. RUPP. Well, I regret that.

Chairman HEINZ. I think we have discussed it enough. If you care to submit any additional statements for the record, we will be pleased to put them in.[1]

Thank you all very much.

Mr. MCGUIRE. Thank you.

Chairman HEINZ. Our next panel consists of Matthew Farrell, James Jones, Jr., and Peter Dys. Would you please come forward, gentlemen.

Mr. Farrell, you are another distinguished fire chief.

Mr. FARRELL. Thank you, Senator.

Chairman HEINZ. I do not know who is guarding the Manhattan Borough right now.

Mr. FARRELL. I have two able assistants. I hope that they are doing their job.

Chairman HEINZ. We are delighted to have you here.

STATEMENT OF MATTHEW J. FARRELL, ASSISTANT CHIEF AND MANHATTAN BOROUGH COMMANDER, NEW YORK CITY, N.Y., FIRE DEPARTMENT; ACCOMPANIED BY ROBERT J. BUTLER, DEPUTY ASSISTANT CHIEF

Mr. FARRELL. Prior to making my presentation if I may, I would like to acknowledge the presence of my associate, Chief Robert Butler. Chief Butler was very helpful to me in getting the supporting data and information for this presentation.

In 1977, the New York City Fire Department conducted a study of fire fatalities for the previous 2 years. It showed what experienced firefighters have known for years, senior citizens suffer an excessive amount of fatalities and serious injuries due to fire, in contrast to other age groups.

The household smoke detector had come into common usage during recent years and it was strongly felt that accelerated use by senior citizens would have an impact on these statistics.

The fire department began a dialog with the New York City Department of Aging with a view toward applying for Federal funding to permit the purchase and installation of smoke detectors in senior citizen residences—this without charge to recipients. While this was initially conceived as a joint program, the fire department

[1] See appendix, item 3. Supplemental material retained in committee files.

eventually became the sole applicant and active agency in this matter.

Community development block funding was granted by the Department of Housing and Urban Development under CD–3, CD–4, and CD–5. These three grants were in approximate portions of $200,000 each, for a total of some $600,000. The qualification criteria, as listed by HUD, was:

Recipients were to be 60 years or older and living alone or with another senior citizen, and residences were to be in low- to moderate-income pockets of the city.

In accordance with the above, the New York City Fire Department eventually covered all five boroughs of the city with emphasis on high density public housing projects meeting HUD guidelines.

The community relations bureau of the fire department was assigned the task of running this program which was divided into two areas: Education and call for assistance, and installation.

Under the first phase, we notified all of the 59 community boards in the city advising them of the availability of free smoke detectors and the installation of same for qualifying senior citizens. We solicited their assistance in identifying other community groups who might be interested and came up with a listing of 60 such groups citywide. This was subsequently reduced to 15 action-oriented groups we felt we could work with effectively.

Although the initial plan was to issue smoke detectors to qualifying persons via these groups, it soon became obvious that the fire department would also have to install the detectors to insure completion of the job. Personnel were hired under CETA and city tax levy funds to permit implementation of the program; originally 14 persons were actively engaged on this project with the number being reduced to eight in the final phase. During each installation, a short fire prevention talk was given along with recommended procedures to follow in the event of fire.

The smoke detectors were purchased and installed in accordance with the three grants. Under CD–3, 16,234 smoke detectors were installed; under CD–4, 16,364 smoke detectors were installed; and under CD–5, 17,094 smoke detectors were installed. The price ranged between $10 and $13.50 per detector. This was due to varied types and brands. The first detectors were all ionization types but from three different manufacturers. The second and third purchase orders were for photoelectric-type detectors.

This program, which started in late 1978 and ended in early 1982, eventually accounted for some 46,000 smoke detectors being installed out of a total of 50,000 purchased. The remaining 4,000 detectors are presently being held by the fire department pending disposition via either the department of housing preservation and development or local community boards.

NEW YORK CITY FIRE FATALITIES
IN PRIVATE AND MULTIPLE DWELLINGS

	1982			1983 (TO 7/25)		
	WITH SMOKE DETECTORS	WITHOUT SMOKE DETECTORS.	TOTAL	WITH SMOKE DETECTORS	WITHOUT SMOKE DETECTORS	TOTAL
MULTIPLE DWELLINGS	45	107	152	35	42	77
PRIVATE DWELLINGS	0	60	60	12	33	45
TOTALS	45	*167	212	47	**75	122

* IN THE OPINION OF THE CHIEF OFFICERS AT THESE FIRES, 88 (OF THE 167) OR 53% COULD HAVE BEEN SAVED IF SMOKE DETECTORS WERE PRESENT.

** IN THE OPINION OF THE CHIEF OFFICERS AT THESE FIRES, 43 (OF THE 75) OR 57% COULD HAVE BEEN SAVED IF SMOKE DETECTORS WERE PRESENT.

The fire department's smoke detector program was concluded in 1982 due to the phasing out of the HUD grants, fiscal cutbacks, and the enactment of legislation that required smoke detectors in residential buildings. Presently, New York City local law 62 requires smoke detectors in all new and most existing residential occupancies.

It is axiomatic in firefighting that the early minutes of a fire are crucial with regard to discovery. This permits for quicker and more effective extinguishment as well as safer and more expeditious evacuation. This is particularly important in the case of senior citizens since infirmities and disabilities make it extremely difficult for them to evacuate fire areas readily.

Sight, hearing, reaction time, tendency to disorientation, motor abilities, and general overall physical capabilities are all factors in safe exit from emergencies.

Smoke detectors work, they are effective, and they can assist in reducing the staggering death and injury rate in this country due to fire. It must also be recognized that these detectors only give warning. People must be educated in the proper response to this warning with emphasis on evacuation and prompt notification to the fire department.

The smoke detector program, under the Federal grant allocation, successfully filled that interim period prior to enactment of present city legislation. Like the first step on a long journey, it was a start. We believe it can serve well as a role model for future actions at all levels of government.

We would like to see a coordinated effort by concerned Federal agencies directed at fire prevention education for the elderly, more protective codes with regard to clothes, bedding, and furnishings, legislation on the self-extinguishing cigarette, information gathering and sharing on fire statistics by the national fire incident reporting system—NFIRS—and similar death and injury data by the National Safety Council.

The need is real. We believe it can be met.

Thank you.

Chairman HEINZ. Chief Farrell, thank you very much. I note that you are accompanied by Chief Butler.

Chief Butler, do you have anything that you would like to add?

Mr. BUTLER. No; I am here to respond to any questions.

Chairman HEINZ. Very well. I appreciate your being here.

Our next witness is James Jones, who is the government affairs representative of the Alliance of American Insurers.

STATEMENT OF JAMES E. JONES, JR., WASHINGTON, D.C., GOVERNMENT AFFAIRS REPRESENTATIVE, ALLIANCE OF AMERICAN INSURERS

Mr. JONES. Thank you, Mr. Chairman.

I am James E. Jones, Jr., a government affairs representative of the Alliance of American Insurers, a national association of 160 property and casualty insurance companies doing business in all 50 States and the District of Columbia.

We very much appreciate this opportunity to appear before the Senate Special Committee on Aging in order to present our views on the importance of smoke detectors.

I will summarize our statement and ask that our official statement be entered in the record.

Chairman HEINZ. Without objection, it will be so entered.

Mr. JONES. The insurance companies want smoke detectors because of their lifesaving benefits. Competition plays a role as well. The insurance industry is a competitive business and when one company issues a new marketing strategy, the rest of the industry takes note. The Insurance Services Office—ISO—an industry advisory rating organization, suggests that a company may offer a premium credit of 2 percent when an approved and properly maintained smoke detector or smoke alarm is installed in the dwelling.

It is my understanding that ISO does not have statistics to actuarially substantiate this credit. The industry supports the installation of smoke detectors and wants to offer a policy credit to encourage policyholders to install the devices in their homes.

As stated previously, insurance is a very competitive industry and when one company markets its product in a unique manner or offers policy credits, the competition encourages or forces other companies to offer a similar or better plan in the marketplace.

The industry is promoting smoke detectors in other ways by informing applicants of insurance at the point of sale and of the benefits of detectors and of the policy credits available.

Stuffers are also being placed in notices to inform company policyholders of the benefits derived from smoke detectors. Companies are placing ads in local and national publications in order to educate the public on this issue.

We support the efforts of the Federal Emergency Management Agency and the Consumer Product Safety Commission in their efforts in promoting smoke detectors and educating the public.

The Federal Government can continue to play a role by promoting smoke detectors in educating the public. Promoting the smoke detectors will help to save lives.

Reports indicate that detectors are lacking in the homes of the elderly and the economically disadvantaged. The Federal Government should target their program toward these groups.

The alliance will continue to support Government efforts in promoting the installation and maintenance of smoke alarms in the home as well as continuing to encourage our members to promote smoke detectors.

Mr. Chairman, we thank the committee for allowing the alliance to present its views and we will be pleased to answer questions.

Chairman HEINZ. Mr. Jones, thank you very much. Your prepared statement will be entered into the record at this point.

[The prepared statement of Mr. Jones follows:]

PREPARED STATEMENT OF JAMES J. JONES, JR.

My name is James J. Jones, Jr. I am a government affairs representative of the Alliance of American Insurers, a national association of 160 property and casualty insurance companies doing business in all 50 States and the District of Columbia.

We very much appreciate this opportunity to appear before the Senate Special Committee on Aging in order to present our views on the importance of smoke detectors.

The alliance recognizes the lifesaving benefit of early warning smoke detectors. We encourage fire safety planning and preparation in cooperation with the installation of smoke detectors. A prepared response to the alarm signal increases the probability of safely escaping from the fire.

The alliance has a history of promoting and encouraging fire safety education. In 1948, the first edition of "Tested Activities for Fire Prevention Committees" was published to assist the Nation's fire service. Five editions were prepared through 1968 and well over 100,000 copies distributed helping to stimulate interest in fire prevention activities. Two popular pamphlets we produced were "Exit Drills in the Home" (Edith) and "Apartment Dwellers Emergency Preparedness Training" (Adept). Both were made available to our members and public service organizations. Two current fire safety pamphlets "Planning for Home Fire Safety" and "Planning for Hotel Fire Safety" are included with this presentation (exhibits 1 and 2).[1] Roughly 500,000 copies of each of these items have been distributed by the alliance plus an additional distribution by alliance member companies.

Another program we are proud of is our home safety and security series. Seven slide and synchronous tape programs have been produced addressing a variety of safety, fire protection, and security topics. The series received the Institute of Industrial Engineers' 1982 Ralph H. Landes award in recognition of its excellence in the slide tape division.

Through the Journal of American Insurance, we are able to reach the public and trade press; public and university libraries; trade, business and consumer groups; and State and national legislators. Most issues contain at least one article relative to public safety. The fall 1982 issue included an article ("Smoke Detectors Do Save Lives") encouraging the installation of residential smoke detectors. A copy of this article is included with our statement (exhibit 3).[1]

The Journal article notes, "Smoke detectors may well be the fire safety success story of the 1970's. Less than 5 percent of all households in 1970 were equipped with the devices; by 1980, a majority of 66 percent had at least one smoke detector."

As an incentive for installing smoke detectors, many insurance companies offer a modest homeowners insurance premium discount when detectors are provided. To obtain some discounts, the homeowner must also have a fire extinguisher in the home. Please remember that homeowners insurance coverage responds most often to property losses and not to the death and injury associated with a fire.

Evidence has shown that besides saving lives, smoke detectors also reduce fire injuries. Although an accepted lifesaving and injury reduction device, the value of smoke detectors in reducing property damage is not as easily qualified. The Center for Fire Research, National Bureau of Standards, is presently analyzing this area. Preliminary evidence from the NBS Center for Fire Research indicates that smoke detectors may reduce property losses in residential fires from 17 to 20 percent. The U.S. Fire Administration study of mobile home fires found a sizable decrease in property loss ($675) per fire when smoke detectors were present in the home.

A smoke detector is not capable of controlling or extinguishing a fire. The effectiveness of people responding to its alarm signal ultimately determines the amount of dollar loss paid by the insurance company. Some variables influencing the outcome, where a typical single station smoke detector is installed, are:

Presence of a responder. If no one is home, the fire grows until noticed by neighbors or a passerby.

The size and location of the fire at discovey. The fire must be small enough to be extinguished by the resources present and safely reached by the responder.

The training and capabilities of the responding party. Preparation and training improves effectiveness. A physically or mentally impaired responder may actually risk injury or death in attempting to extinguish a fire.

Fire extinguishing resources being immediately available. The fire continues to grow and smoke and heat continue to be produced while the responder locates a "safe" extinguishing medium.

Fires not extinguished by the first responder, continue to grow until they burn out or are attacked by sufficient fire extinguishing resources. The amount of dollar loss potential also continues to grow.

The alliance and its members are first interested in saving lives and reducing personal injury. Fire statistics indicate that fire deaths are not uniformly distributed across age groups. The very young and the elderly are affected more than the others. It is believed this is partially due to their inability to evacuate without assistance. Part is also due to the absence of smoke detectors in the homes of elderly

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[1] Retained in committee files.

and economically disadvantaged Americans. Providing smoke detectors will help to reduce this disparity.

We support efforts to encourage the remaining one-third of American homes without smoke detectors to install at least one. We will also continue to remind the two-thirds of American homes with smoke detectors to plan and practice a safe response to the detector's lifesaving warning.

The alliance is pleased to play a part in helping to reduce the number of deaths, injuries, and property losses from fire by encouraging the use of smoke detectors. We stand ready to cooperate with the committee in this effort.

Chairman HEINZ. Mr. Dys.

STATEMENT OF PETER DYS, EXECUTIVE DIRECTOR, LANCASTER COUNTY, PA., OFFICE OF AGING

Mr. DYS. Good morning, Mr. Chairman.

As some of those who have preceded me, I will also ask that my full comments be a part of the record and I will proceed to condense them.

Chairman HEINZ. Without objection,[1] let me just thank you for not only making the trip down here from Lancaster County but also for the great work that you have done with area agencies on aging, not just in Lancaster County, but also for many others throughout the State of Pennsylvania as a model area agency on aging. We are very proud to have so many able people in that area. I do not know if Mike Rodgers has been in the room today, but I think you may have known him in his previous incarnation when he was one of your brethren. I am very proud that Pennsylvania produces such talented public servants, and I thank you and I welcome you.

Mr. DYS. Thank you, Mr. Chairman.

I might just add that the leadership role Pennsylvania has played is due in large part to your leadership role and the pride with which our association across the State of Pennsylvania regards you and your efforts here in this committee.

Chairman HEINZ. Compliments will get you almost anything. Whether they will get you more funding depends on the other Senators.

Mr. DYS. Today we are only after smoke detectors.

Chairman HEINZ. Please proceed.

Mr. DYS. Thank you.

I am the executive director of the Lancaster County Office of Aging in Lancaster, Pa. I have been the director of that agency since its inception in 1973, and I am pleased to note that we are able to offer a broad array of programs and services aimed at keeping older persons in their own homes and community for as long as possible. The prime funding for our agency comes from the Older Americans Act, State lottery funds, and title XX funds. Our service population is made up of over 60,000 elderly. We annually serve between 16 percent and 20 percent of that total population.

I compliment you, Mr. Chairman, on your hearing today as we consider the extreme importance of smoke detectors in the homes of older persons. I have been extremely concerned about the same issue and have both considered and pursued various efforts at the local level in order to try to resolve this problem. Although the pre-

[1] See page 57.

vious testimony has already emphasized the need and benefit of smoke detectors, I must emphasize my concern about the vulnerable clientele who are least able to use their natural defenses for fire prevention and are also least able to afford the purchasing and installation of this important lifesaving device. This concern is not only substantiated by my experience but is statistically borne out as well. As you have previously noted, in Pennsylvania, with a total elderly population comprising 11 percent of our total State population, 25 percent of the total fire deaths in Pennsylvania affect elderly persons. That is truly an alarming statistic.

Because of my concern at the local level, I have tried to provide solutions to this problem. Our agency has provided a constant diet of information to our senior centers regarding the importance of fire prevention. We have made arrangements for our clubs and organizations to have fire safety education programs as well as information about appropriate smoke detector units for purchase and installation. We have run news articles in our agency's newsletter and publicized the importance of smoke detectors in the local newspapers. We have met with nearly all of the paid and volunteer firefighting companies which have been most helpful and cooperative in providing education and assistance. However, despite this education and concern, money is not available to actually purchase units for installation in the older person's home.

The private sector has also been contacted and is sympathetic with the need and has committed itself to assisting the community agencies in solving this problem. However, the need is so great and the scope is so broad that it is unrealistic to expect the private sector to meet this total need.

Mr. Senator, I am excited by your interest and effort demonstrated by this hearing in order to assist older persons in obtaining this necessary device. It is my ultimate desire to see funds made available for the purchase and installation of these units. To that end, I would support any option which would result in greater access of smoke detectors for senior citizens. As I consider this task, I see various options that you and your colleagues may be able to pursue as an avenue to make our mutual efforts a reality.

First, funding could be made available through the community services block grant that is administered by the Office of Community Services.

Second, a funding emphasis of discretionary funds could be allocated to local communities through the community development block grant.

Third, an option that should also be considered would be to utilize the weatherization program which is available again in most service communities.

Fourth, a special allocation could be made through title III–B of the Older Americans Act for the actual purchase and installation of smoke detectors. Another option within the same system would be to emphasize the importance of using Older Americans Act funds for the purchase of smoke detectors.

Fifth, the option that I see as most viable for the quick acquisition and distribution of smoke detectors would be the granting of funds from the Federal level to the 57 State units on aging who could quickly distribute those funds to the 662 area agencies on

aging based on the percentage of elderly poor currently residing within each area agency on aging project service area.

Mr. Chairman, I would simply like to emphasize that if the AAA delivery system had access to the funds for the purchase and installation of these smoke detector units, I am confident that they could implement the project to meet the priority needs of aged clientele. Our agency's role as a pooling and coordinating community agency has cemented relationships with home chore programs, weatherization programs, community organizations, paid and volunteer fire companies, and so forth.

I am very confident about this offer because of my previous experience in a similar program. In 1978, I became concerned about older persons' security needs. As a result, I purchased 13,000 dead-bolt doorlocks with Older Americans Act dollars. Within a 3-week period, all 13,000 locks had been picked up by older persons in our office. For those who could not install those locks, the home chore program not only installed the locks for them but also provided many other services needed for these older individuals. In addition, our visibility in the community is extremely high. Out of a total elderly population of nearly 60,000, over 7,000 persons walked into our office this year. Nearly 26,000 telephone calls were made to our agency and over 33,600 persons have received an office of aging I.D. card. It is for this reason that I have no doubt in my mind that should the units be available, installation could be made quickly and efficiently.

In conclusion, let me simply emphasize that the aging service delivery network currently exists with a priority system in place to meet the needs of older persons. As head of one of 662 area agencies on aging in this country, I am confident that the system can deliver on the purchase and installation of smoke detectors. I am excited at the potential impact that our mutual effort could effect in the ultimate elimination of this tragic loss involving older persons.

I thank you for this opportunity to provide this testimony and pledge my support to your continued efforts to see this necessary service becomes a reality.

Thank you.

Chairman HEINZ. I thank you. I would like to note the excellent work that your agency has done. I thank you specifically and especially for your example regarding the dead-bolt doorlocks, for two reasons. First, you showed how effective you could be in getting something installed. Second, protecting the elderly against victimization has been of traditional interest to this committee.

Mr. Dys. Thank you.

[The prepared statement of Mr. Dys follows:]

PREPARED STATEMENT OF PETER DYS

Good morning, Mr. Chairman. My name is Peter Dys. I'm the executive director of the Lancaster County Office of Aging in Lancaster, Pa. I have been the director of that agency since its inception in 1973, and I am pleased to note that we are able to offer a broad array of programs and services aimed at keeping older persons in their own homes and community as long as possible. The prime funding for our agency comes from the Older Americans Act, State lottery funds, and title XX funds. Our service population is made up of over 60,000 elderly and we annually serve between 16 and 20 percent of that total population.

From the Federal perspective, our agency is known as an area agency on aging. I am one of 662 agencies that exist across this country to provide assistance and referral to millions of older persons each year. This proven service delivery network is viewed by many older persons as their prime source of support and assistance.

I compliment you, Mr. Chairman, on your hearing today as we consider the extreme importance of smoke detectors in the homes of older persons. I have been extremely concerned about this same issue and have both considered and pursued various efforts at the local level in order to try to resolve this problem. Although the previous testimony has already emphasized the need and benefit of smoke detectors, I must emphasize my concern about this vulnerable clientele who are least able to use their natural defenses for fire prevention and are also least able to afford the purchasing and installation of this important lifesaving device. This concern is not only substantiated by my experience but is statistically borne out as well. In Pennsylvania, the total elderly population comprises 11 percent of our total State population. However, the Pennsylvania Fire Commission notes that 25 percent of the fire deaths in Pennsylvania were elderly persons. The statistics are truly alarming.

Because of my concern at the local level, I have tried to provide solutions to this problem. Our agency has provided a constant diet of information to our senior centers regarding the importance of fire prevention. We have made arrangements for our clubs and organizations to have fire safety education programs as well as information about appropriate smoke detector units for purchase and installation. We have run news articles in our agency's newsletter and publicized the importance of smoke detectors in the local newspapers. We have met with nearly all of the paid and volunteer firefighting companies which have been most helpful and cooperative in providing education and assistance. However, despite this education and concern, money is not available to actually purchase the units for installation in the older person's home.

The private sector has also been contacted and is sympathetic to the need. It has committed itself to assisting the community agencies in solving this problem. However, the need is so great and the scope is so broad that it is unrealistic to expect the private sector to meet this total need.

Mr. Senator, I am excited by your interest and effort demonstrated by this hearing in order to assist older persons in obtaining this necessary device. It is my ultimate desire to see funds made available for the purchase and installation of these units. To that end, I would support any option which would result in the access of smoke detectors for senior citizens. As I consider this task, I see various options that you and your colleagues may be able to pursue as an avenue to make our mutual efforts a reality.

(1) Funding could be made available through the community services block grant that is administered by the Office of Community Services. The proposed service is certainly within the scope of this funding system. However, I'm concerned about its potential implementation. This agency has been cut back considerably during the past several years and, as a result, is too decentralized from the local service delivery network.

(2) A funding emphasis or discretionary funds could be allocated to local communities though the community development block grant. Again, it seems as through it is an appropriate mechanism in order to get funds to the local level. However, the ultimate objective would be hindered by numerous factors. The purchase and installation of smoke detectors certainly is now an eligible service. However, the demonstrated lack of effort across the country indicates that the priorities that are placed on local community decisionmakers has always been for other services. I have personally submitted grant requests for smoke detectors but was turned down because it was a new service that could not be considered in light of the diminished funding and the other high priority services. In addition, there is the fragmentation between Community Development Act funds made available to both cities and counties who require service to individuals living within their respective boundaries. I fear the fragmentation and potential lack of access to the smoke detectors should funding become available through this system.

(3) Another option would be to utilize the weatherization program which is available in most service communities. It is my experience that this service is rendered by numerous community agencies with rather restrictive eligibility requirements and pressing limits on the amounts that they can spend on each individual home. My experience has shown that there is often a lack of stability in the weatherization program due to the ebb and flow of State and Federal funding for this program.

(4) A special allocation could be made through title III-B of the Older Americans Act for the actual purchase and installation of smoke detectors. Another option

within the same system would be to emphasize the importance of using Older Americans Act funds for the purchase of smoke detectors.

By theory, this option is already either present or could be required by legislation. I am somewhat cautious about this option for the following reasons. As you already know, Older Americans Act funds are in high demand for already mandated or required services. If additional requirements were placed on the same allocation, it would put an increased burden on all services already under severe stress. If an additional percentage allocation was made available through the Older Americans Act, the intent and purpose of the act would cause some concern for local implementation. First of all, the act, although it prioritizes clientele, does not eliminate any persons 60+ from its services. Although we may mutually desire to see these units in the homes of all older persons, it may become a necessity to set up priorities such as income eligibility as a prerequisite to the receipt of a smoke detector. Under the current regulations in the act, this does not seem to be a viable option. In addition, my local advisory board feels that older persons would be willing and able to contribute to the cost of the unit. A sliding fee scale is not allowable under the act and would be difficult to implement under a "donation" which is allowed under the act.

(5) The option that I see as most viable for the quick acquisition and distribution of smoke detectors would be the granting of funds from the Federal level to the 57 State units on aging who could quickly distribute those funds to the 662 area agencies on aging based on the percentage of elderly poor currently residing within each area agency on aging project service area. The guidelines relative to these funds should simply indicate that the money may be used for the purchase and installation of smoke detectors for those persons 60 years of age and older. A sliding fee scale or suggested donation level could be allowed for the purchase of the unit with all funds received going into a revolving account that would be used solely for the purchase of additional smoke detector units. The actual installation of these units could take place through the home chore program that is operational either directly or by subcontract through most area agencies on aging throughout the country. This option takes full advantage of the stable and credible aging service delivery system already set up to serve the 60+ population.

Mr. Chairman, I would simply emphasize that if the AAA delivery system had access to the funds for the purchase and installation of these smoke detector units, I am confident that they can deliver in the implementation of the project to meet the priority needs of aged clientele. Our agency's role as a pooling and coordinating community agency has cemented relationships with home chore programs, weatherization programs, community organizations, paid and volunteer fire companies, service clubs, Boy Scout groups, etc., all of which could be accessed for this important effort.

I am very confident about this offer because of my previous experience in a similar program. In 1978, I became concerned about older persons' security needs. As a result, I purchased 13,000 dead-bolt doorlocks with Older Americans Act dollars. Within a 3-week period, all 13,000 locks had been picked up by older persons in our office. For those who could not install those locks, the home chore program not only installed the locks for them but also provided many other services needed in order to maintain their households. In addition, our visibility in the community is extremely high. Out of a total elderly population of nearly 60,000, over 7,000 persons walked into our office this year. Nearly 26,000 telephone calls were made to our agency and over 33,600 persons have received an office of aging I.D. card. It is for this reason that I have no doubt in my mind that should the units be available, installation could be made quickly and efficiently.

In conclusion, let me simply emphasize that the aging service delivery network currently exists with a priority system already in place to meet the needs of older persons. As one of 662 area agencies on aging in this country, I am confident that the system can deliver on the purchase and installation of smoke detectors. I am excited at the potential impact that our mutual effort could effect in the ultimate elimination of the tragic loss to older persons.

I thank you for the opportunity to provide this testimony and pledge my support to your continued efforts to see this necessary service become a reality. Thank you.

Chairman HEINZ. Chief Farrell, in a 3- or 4-year period you really did a remarkable thing in New York. You installed a very significant number of smoke detectors, some 46,000.

Mr. FARRELL. Yes, 46,000.

Chairman HEINZ. I want to commend you and your department for doing an excellent job.

In the light of your experience in New York City, what role do you see the Federal Government taking in the promotion of smoke detectors today?

Mr. FARRELL. Mr. Chairman, what I would like to see is the Federal Government consider the New York City smoke detector law as perhaps a role model for Federal legislation. Also, I would like to see a continuation of HUD grants to the targeted group which we have discussed which is the low-income elderly who really do not have the means to afford a smoke detector.

Chairman HEINZ. Was the grant that you received a Secretary's discretionary grant?

Mr. FARRELL. I believe it was, sir, yes.

I believe there was one other important area which came to bear more strongly as we went on, and that was fire safety education. We found out, much to our surprise, that the senior citizens in New York were really woefully unaware of the very basics of fire safety. You know, escapes from apartments, action to take, and so forth.

In connection with that, we are presently working with the U.S. Department of Health and Human Services under a pilot project grant to remedy this. We have an 18-month program where we are providing for these citizens at the 125 centers that we have in New York. I would like to see some pursuit on the standards that were discussed for cigarette legislation at one of the earlier panels here.

I would also like to applaud Commissioner Steorts, Chairman Statler, and the Consumer Product Safety Commission. They have an excellent smoke detector program. I have been looking at its impact on New York. I am sure that it will be a big boost nationally.

Chairman HEINZ. I was not only impressed, I was frankly amazed by the aggressive goal to install smoke detectors in every single residence by the end of this year. Are they going to be able to do it?

Mr. FARRELL. I do not think so, but I heartily applaud her reaching for that. You know, I am a great believer in trying to grab as much as you can and then step back. I do not like settling for less.

Chairman HEINZ. If it is not attainable, and I join with you in saluting that goal, what will be the biggest difficulty encountered?

Mr. FARRELL. Well, I believe that we will have some problems in the areas of funding, obviously. I think many local communities have ups and downs. I know New York has. We do not have the resources or manpower to be able to do some of the things we want. I think the media is another important thing. In fact, what we are doing today is extremely important because the group that we are talking about looks more and more toward the Federal Government, and rightfully so, for assistance. Maybe it will gain status since it has been at the back burner for many years. Perhaps this will give it a little bit of front burner status and we will be able to get something out of it.

Incidentally, the one point I would like to make is that smoke detectors do work.

In January 1982, the New York City smoke detector law went into effect. The most recent figures that we have been able to look

at indicate that in 1981, we had 90 people die in New York City who were 60 years and older.

Chairman HEINZ. Ninety people died from fire deaths?

Mr. FARRELL. Fire deaths, yes.

Chairman HEINZ. If only 90 died out of 12 million people, we are all going to move there.

Mr. FARRELL. I stand corrected, and I thank you. When I talk of deaths, I always talk of fire deaths and I forget other people are not that attuned to the fire situation. We had 90 people die in 1981 from fire deaths. In 1982, the first full year we came under the smoke detector law, we had 65 deaths. This is a 28-percent reduction.

Now, this could be one of those aberrant numbers that we do see occasionally. But perusal of the figures for 1983, up until this Monday, right up until July 25, indicate that we are holding that figure and may very well come out to something slightly below it again this year. It is very encouraging.

I admit it is a little too early, but it is certainly encouraging.

Chairman HEINZ. It is a most commendable, encouraging, and very valuable statistic. I thank you for citing that to us.

Mr. Jones, although you have testified that the insurance industry is taking some initiatives, could the industry be still more aggressive in promoting smoke detectors through such mechanisms as increased premium discounts beyond those that you mentioned, initial rebates of the cost of the smoke detector and/or supplying smoke detectors at cost?

Mr. JONES. Mr. Chairman, you will find that there are some 2,900 companies within the industry and some 900 who operate in all 50 States. And each company has a different program. That 2 percent is the initial discount. Some companies go up as high as 15 percent in offering discounts in correlation with fire extinguishers, dead-bolt locks or other security or safety measures that are within the homes.

The industry, and the alliance in particular, has been involved in public safety for some 35 years and we think that the majority of our members are also concerned. But it is an individual effort because each company is an individual business operation and I think that they are expressing their social conscience in attempting to help and promote smoke detectors by offering discounts.

As I mentioned, we do not have the numbers to substantiate how smoke detectors save or reduce property losses. We are convinced that they do save lives, as Chief Farrell has stated and this has been brought out here today. But the numbers are not in as to how they will reduce property losses. All they do is alert the individual that there is a fire and we would like to see the numbers. This is something that the Government can help with in providing the information.

Chairman HEINZ. What, if anything, is the industry doing to determine the extent to which the detectors reduce property damage?

Mr. JONES. We are not coding this information. It would be expensive to do. Our recommendation would be that this is something that the National Bureau of Standards might be able to help on. I understand they are working in this area to develop the statistics.

Chairman HEINZ. Have any of the State agencies such as the California Bureau of Home Furnishings done any work in this area?

Mr. JONES. Not to my knowledge. I am sure that they probably have, but I am not aware of it, Senator.

Chairman HEINZ. Well, it is interesting that some of your companies have a 2-percent credit. Others, as you testified, have as much as a 15-percent credit. Is there something that the 15-percent people know that the 2-percent people do not know?

Mr. JONES. As I say, that is in conjunction with other protective devices within the homes. It depends on whether the alarm system is piped into the fire department or into other central agencies or with other safety devices that will decrease property losses. This would reduce the cost of the insurance.

Chairman HEINZ. Your suggestion that the National Bureau of Standards study the reductions in property damage may be a good one. I am a little concerned, though, that the industry itself has not surveyed State consumer protection agencies or institutions to determine what studies have been made at the State level. Insurance regulation is predominantly a State function, at least that is what my State Insurance Commissioner keeps reminding me.

Mr. JONES. He is definitely right, sir.

Chairman HEINZ. Up in Pennsylvania, and whenever we consider any insurance legislation down here, their organization comes en masse to remind us that they should remain the principal regulators of insurance. I would be more comfortable with your recommendation if I was persuaded that your industry had at least looked around the lower 48 to find out what is going on.

Mr. JONES. You are definitely correct that we are a State-regulated industry. As I mentioned, I am not aware, but I will be glad to check and provide that for the record.

Chairman HEINZ. That would be very helpful.

Mr. JONES. As to what is happening on the State level to provide the statistics.

Chairman HEINZ. I would appreciate that.

[Subsequent to the hearing, Mr. Jones submitted the following information:]

Mr. Chairman, the Alliance has asked each of its regional offices to contact State officials in their region in an attempt to identify State consumer protection agencies or other State agencies which have conducted or contemplated conducting studies in order to determine the effect smoke detectors may have on reducing property losses. We have regional offices in Atlanta, Austin, Boston, New York, and San Francisco. Our regional offices were not able to locate State agencies which had performed research which would determine what results smoke detectors may have on reducing property losses from fires.

The only studies which have been conducted to our knowledge, were undertaken by Federal agencies which our testimony indicated.

We will ask our regional offices to continue to be on the alert for State studies which denote the effect the installation of smoke dectectors in the home have on property losses.

Senator, some feel that a 2 or 4 percent discount for installing smoke detectors in the home does not appear to be very much. The discount really amounts to approximately twice as much when you consider that the fire portion of the homeowners policy is only one of several perils insured under the policy. The total number of perils covered under the policy could vary from 11 to 19 depending on which of the homeowners policies you may purchase. The fire premium is only one portion of the total premium however, the discount is granted on the total policy premium. If the

discount is 2, 3, 5, or 15 percent, in reality, the discount is approximately 4, 6, 10, or 30 percent. Therefore, whatever discount an insurance company may offer to a policyholder for installing the smoke detector in their home, the percentage of discount granted is increased, since the discount is granted on the total policy premium.

Chairman HEINZ. I have been saving, of course, the best for last. No offense to any of my other witnesses, but we Pennsylvanians stick together.

Mr. Dys, in your testimony you spoke about several options the Federal Government could pursue to promote the installation of smoke detectors. If you had to pick out one thing that you would like see us do, what would it be?

Mr. DYS. I think my prime goal would be, if you want a smoke detector in the home of an older person and you want it out there quickly, in fact I would love to team up with the organization that has the objective for 1983 because I could implement it quite quickly in Lancaster County, it would be to bypass as many systems as possible with a clear earmark on the dollar as to how it can get into the hands of the agencies and organizations set up to serve older people. As I have indicated in my testimony, the clientele know who we are as an agency. I would recommend that we make an allocation, whether it comes through the arm twisting or cajoling of HUD or other organizations. I am sure that your contacts with Secretary Heckler could begin to eye some of the discretionary money that is out there and make that money available through the 57 State units on aging, through the Administration on Aging, and get it into the hands of those AAA's quickly. I am confident that even at the local level we could increase that money. We could do so in the sense of making those available for a donation or for a sliding fee scale to maintain the contact with the priority clientele and put that money into a revolving account to allow us to purchase more of those so that we get more bang for the dollar.

Chairman HEINZ. Do you think there are in fact more things that the insurance industry could do to encourage or reward the installation of smoke detectors, other than those to which Mr. Jones has testified?

Mr. DYS. I laud the industry in its sensitivity and concern. I fear, however, that it has come far too late for many older persons.

I would say that right now the priority for older persons is making sure that they have an adequate third-party health insurance system which is sapping their income from them. More concern should be raised over the high number of priority clientele who are more concerned about living, staying alive, paying for medication and their rent. They do not have property insurance, and to me it is incongruous for us to give that sort of a high stimulus and at the same time have the most needy individual remaining without that support. I think that is an overriding concern which I have, coupled with the horror stories that I am sure do not dominate the industry but certainly are present. The older person who is contacted by numerous insurance organizations with all sorts of gimmicks and percentages. They understand very little of it. I know that, because I do not understand it and for that clientele trying to read English into a statement that isn't clear is a bit more than we can expect.

Chairman HEINZ. Do any of you have further comments?

Mr. JONES. Senator, I would like to mention the fact that installation of smoke detectors is not the only problem. Maintenance is also a big problem because many people who have smoke detectors are not operating them because the battery has gone dead and people do not check them out once a month or periodically as they should. I think that is important. Once the smoke detector has been installed, the maintenance and backup should be provided as well. It is an ongoing thing.

Chairman HEINZ. As somebody who always seems to have one smoke detector disassembled and lying on the desk in my own home awaiting installation of new batteries, I think that is a very key point and one that the chairman certainly can't forget.

Mr. DYS. Mr. Chairman, might I just add as a way of assisting in that process, the in-home services offered through the area agencies on aging and through the Older Americans Act would allow for both the checking and/or the replacement of any maintenance that is necessary for these items.

Chairman HEINZ. Mr. Dys, Mr. Jones, Chief Farrell, we thank you very much for your help to the committee. It may be that we are beginning to learn from the good work that you have done in New York City and from the abilities of our area agencies on aging that it can be very effective to get things done at the local level.

The insurance industry may be a little behind the eight ball but it seems to be moving in the right direction. I again want to say that I am delighted with Chairman Steorts' very aggressive, and according to her own goals, very successful efforts to promote the installation of these detectors.

Thank you all very much.

[Whereupon, at 12:17 p.m., the hearing adjourned.]

APPENDIX

MATERIAL RELATED TO HEARING

ITEM 1. SUMMARY OF STATE SMOKE DETECTOR REQUIREMENTS, PREPARED BY THE STAFF OF THE SENATE SPECIAL COMMITTEE ON AGING

Twenty-nine States require smoke detectors in all new classes of residential construction: Alabama, Alaska, Arizona, California, Colorado, Connecticut, Florida, Hawaii, Idaho, Indiana, Maine, Maryland, Massachusetts, Minnesota, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Oregon, Rhode Island, South Carolina, Virginia, Washington, Wisconsin, Wyoming, and the District of Columbia.

Twenty-two States require one or more classes of existing residential housing to be retrofitted with smoke detectors. Most States prescribe conditions that trigger a retrofit requirement: Alabama, Alaska (at the time of sale), Arizona (if the sleeping area is remodeled and requires a building permit), Arkansas (existing buildings housing 15 persons or more undergoing remodeling efforts totaling 50 percent or more of the value of the building), Hawaii (when remodeling costs exceed $1,000), Iowa (dormitories and apartment buildings), Kentucky (apartment buildings), Maine (multiunit apartments), Maryland (at the time of sale and all multifamily dwellings), Massachusetts (at the time of sale), Minnesota, Nebraska (when an owner-occupied single family house is remodeled; immediately for all rentals), Nevada (excludes single family houses), New Jersey (excludes single family houses), New Mexico (when costs of remodeling exceed $1,000), North Dakota (apartment buildings), Ohio (excludes single family houses), Oregon (single family houses when remodeling costs exceed $1,000; all others must retrofit now), South Carolina, Texas (all rentals), Washington (excludes owner-occupied single family houses), and Wyoming (when costs of remodeling exceed $1,000 or when one or more sleeping rooms are added).

Three States require special detectors for the deaf and hearing impaired: Arkansas, North Dakota, and Maryland.

ALABAMA

CURRENT STATUS

Smoke detectors are required in all new and existing residential buildings. This requirement is applicable to single family dwellings as well as multiunit dwellings. During the 1981 legislative session, a law was passed to require a smoke detector in each hotel guest sleeping room. This law is applicable to new and existing buildings. Smoke detectors are also required in all hospitals which are not already equipped with automatic sprinkler systems, all correctional institutions, and all child day care centers. Battery operated smoke detectors are permitted in existing structures, but smoke detectors in new structures must be wired into the main power source.

CODES

Alabama has adopted the 1976 Edition of Standard Building Code and the Standard Fire Code which are mandatory throughout the State. For institutional buildings, the 1976 Edition of LCS 101 is enforced. Local ordinances are permitted but must not be in conflict with State ordinances.

1981 BILL INTRODUCTIONS

Two bills were introduced in the 1981 legislative session. S. 29 and H. 40 would require hotel owners to install and maintain smoke detectors in each hotel guest sleeping room. S. 29 would also include provisions for maintenance of detectors and would establish penalties for tampering with or removing a smoke detector from a room.

S. 20 passed in law as Act 290.

H. 40 died.

ALASKA

CURRENT STATUS

Alaska requires smoke detection devices in all living units built, manufactured, or sold in the State. This law is interpreted to include all existing buildings. Smoke detection devices must comply with NFPA 74. In addition to single station smoke detectors for each dwelling unit, supervised smoke detection systems are required in hospitals, nursing homes, homes for children, jails, prisons, apartment buildings, and hotels.

CODES

For fire prevention, Alaska has adopted, with amendments, the 1979 Editions of the Uniform Building Code, the Uniform Fire Code, and the Uniform Mechanical Code.

The State fire marshal's office is part of the Department of Public Safety. The department has adopted rules and regulations relating to fire detection and suppression equipment as well as safety criteria for commercial, industrial, business, institutional, and other public buildings, and buildings used for residential purposes (four or more dwelling units).

1981 BILL INTRODUCTIONS

None. However, a study on the use of smoke detectors in rural Alaskan residences was prepared for the Alaska Council on Science and Technology which is administering a research program on this subject.

ARIZONA

CURRENT STATUS

Arizona has no smoke detector legislation applicable to residential housing. Schools and health care institutions are required to have smoke detection systems. Hotels and motels require smoke detectors in each guest unit. On April 13, 1983, S. 1370 passed, requiring smoke detectors in newly constructed residential housing units and in existing residential housing if the sleeping area is remodeled and requires a permit.

CODES

The Arizona State fire marshal's office enforces a minimum standard State code based on the 1979 Edition of the Uniform Fire Code. The 1981 Edition of the LSC 101 has also been adopted. Fire codes applicable to residential buildings are left to the local jurisdiction.

ARKANSAS

CURRENT STATUS

Arkansas has no legislation applicable to residential housing. In the 1981 session, legislation was passed to require smoke detectors in nursing homes. In addition, smoke detectors are now required in motels, hotels, and institutions with high volume capacities.

CODES

Arkansas enforces the 1965 Arkansas State Fire Prevention and Building Code, which has no provisions for smoke detectors. The State marshal's office is working with the Arkansas Department of Labor, the Arkansas State OSHA office, and other interested parties to revise the 1965 code which will include provisions to re-

quire smoke detectors in occupancies of more than 15 persons, triplexes, and apartment buildings. (Under Arkansas law, a building must house more than 15 persons to be under the jurisdiction of the fire code. However, new residences built by contractors for resale will have to comply with the code.) Existing structures undergoing remodeling efforts totaling 50 percent or more of the value of the building will also have to be brought into compliance.

Arkansas law requires legislative approval before a revised code can be adopted. The revised code is expected to be presented to the legislature in January 1983.

BILL INTRODUCTIONS

HB. 954, which passed into law (Act 570, 1981), amends sections 1 and 2 of Act 374, 1979. Act 374 required licensed nursing homes to install and maintain either a sprinkler system or a particle sensor device system with visual signals outside each room by June 30, 1981. Act 570 repealed the June 30, 1981, deadline. Nursing homes that had not yet begun installation of an approved system at the time of passage were required to begin installation immediately.

CALIFORNIA

CURRENT STATUS

All new dwelling units are required to have smoke detection devices. Requirements for existing housing arc handled on a local basis.

CODES

California enforces the State housing law which references in 1976 Edition of the Uniform Building Code. The law includes jurisdiction over one and two family dwellings and apartment buildings.

1981 BILL INTRODUCTIONS

AB. 683 would authorize a credit of an amount equal to 25 percent of cost of a fire protection system installed in a dwelling owned by the taxpayer. The State fire marshal would adopt regulations which would establish minimum standards for systems. Pending.

COLORADO

CURRENT STATUS

Smoke detectors are required in all new residential, multifamily, and manufactured construction, hospitals, nursing homes, and other residential care facilities.

Requirements for smoke detectors in existing buildings is left to local jurisdictions.

CODES

Colorado has no statewide fire code. The State enforces the 1979 Edition of the Uniform Building Code, a mandatory minimum standard code. Local jurisdictions may adopt more stringent standards. Currentiy, the administrative process of adopting the 1979 Edition of the UBS is almost completed.

For hospitals and other public institutions, a combination of the 1976 and 1973 Editions of LSC 101 are used.

1981 BILL INTRODUCTIONS

HB. 1282, which would have given counties the authority to establish fire codes, died in committee.

CONNECTICUT

CURRENT STATUS

New single family dwellings and multifamily residential buildings must be equipped with smoke detectors. Hospitals and convalescent homes not equipped with sprinkler systems must be equipped with smoke detectors. Requirements for public buildings depends on occupancy and type of building.

CODES

The fire safety code, which is administered by the State fire marshal's office, has no jurisdiction over single family dwellings. The requirements for single family dwellings are found in the general statutes.

1981 BILL INTRODUCTIONS

HB. 6882 would have given the State Fire Safety Code Standards Committee the authority to prepare a fire safety code and would have required the use of national standards when preparing the code. According to a bill analysis by the Connecticut Office of Legislative Research, specific reference to smoke detection devices in residential buildings would be eliminated under this bill which died in committee.

DELAWARE

CURRENT STATUS

As of July 1982, any new, extensively altered, or renovated residential building or mobile home must be equipped with smoke detectors.

CODES

The State fire marshal's office enforces the "Fire Prevention Rules and Regulations for the State of Delaware." It is based on the 1973 NFPA's fire prevention code. Use of the LSC for residential buildings and hospitals was adopted December 7, 1981.

FLORIDA

CURRENT STATUS

The following must have smoke detectors: Hotels, motels, and time share condominiums; dwellings of three stories or more; new residential homes; new and existing nursing homes and hospitals; any lodging-type facilities, one or two family dwellings.

CODES

Florida has no fire code, but there is the Florida Safety Board which makes rules and regulations.

Florida enforces the mandatory State Minimum Building Code which is based in the 1976 Edition of the Southern Building Code, the National Building Code, and the One and Two Family Dwelling Code. The portions of the codes requiring smoke detectors in residences were not adopted.

1981 BILL INTRODUCTIONS

None.

GEORGIA

CURRENT STATUS

Georgia has no smoke detection requirements for residential housing. Smoke detectors are required in motels, hospitals, and nursing homes in a manner prescribed by the 1976 Edition of LSC 101.

CODES

The State fire marshal's office enforces the 1976 Edition of the LSC 101 which is part of the 1949 Georgia Safety Fire Act, as amended in 1968.

1981 BILL INTRODUCTIONS

HR. 9, which would require smoke detectors in apartment buildings, was still in committee when the legislature adjourned.

HAWAII

CURRENT STATUS

There is no smoke detector legislation at the State level in Hawaii because the State no longer promulgates codes. However, each county and island requires smoke detectors in nursing homes, hotels, motels, and new residential construction. In addition, existing buildings are to be equipped with smoke detectors when renovation costs exceed $1,000.

CODES

Each county and island in Hawaii has adopted the 1978-79 Edition of the Uniform Fire Code.

1981 BILL INTRODUTIONS

None.

IDAHO

CURRENT STATUS

One smoke detector is required in every new dwelling unit; other buildings depends on occupancy or type of apartment.

CODES

Idaho has adopted the 1979 Edition of the Uniform Building Code and the 1965 Edition of the Fire Prevention Code. Neither is mandatory statewide. Local jurisdictions may adopt any code they choose; however, any local jurisdiction which chooses not to enforce the State codes must give written notification to the State fire marshal's office. Several counties and towns in Idaho have adopted no code.

ILLINOIS

CURRENT STATUS

Illinois has no statewide smoke detector legislation for residential buildings. Automatic smoke detection systems are required for nursing homes, hospitals, and other institutional buildings. Hotels with more than two stories or an occupancy of more than 20 persons are required to install smoke detectors which plug into an electrical outlet and which must contain a standby battery. Smoke detection systems are required in the sleeping rooms and the halls of all institutional buildings. Industrial buildings must install smoke detectors unless there is a sprinkler system.

CODE

Illinois developed and enforces its own code, "Illinois Rules and Regulations for Fire Prevention and Safety."

1981 BILL INTRODUCTIONS

None.

INDIANA

CURRENT STATUS

Indiana requires smoke detectors in all new homes, mobile homes, boarding houses, hotels, and motels.

CODES

Indiana has adopted the 1979 Edition of the Uniform Building Code. A municipality may adopt codes other than these adopted by the State as long as the provisions are not in conflict with the State code.

1981 BILL INTRODUCTIONS

S. 349 would have created a "hotel and motel fire safety advisory study committee" to study fire safety devices and systems and tax incentives to promote compliances. It passed the Senate and was referred to the House where it died in committee.

SCR. 3 would have directed the State Fire Prevention Commission to draft a fire prevention code for the State by July 1, 1983. The bill died in committee.

Iowa

CURRENT STATUS

There are no statewide mandatory requirements for smoke detectors in noncommercial residential buildings. Legislation, described below, was passed during this legislative session.

CODES

Iowa has a State building code and has also adopted the LSC 101. The State building code requires smoke detectors in new buildings; but it is not mandatory for cities and localities to adopt the code.

1981 BILL INTRODUCTIONS

S. 324, which would require a smoke detector in each sleeping room and corridor of hotels, motels, dormitories, apartments, and other residential buildings, has passed and was signed by the Governor.

H. 467, which would authorize the State fire marshal to promulgate fire safety rules includes a provision to make noncompliance with the provisions of the law a misdemeanor. The bill was passed and signed by the Governor.

Kansas

CURRENT STATUS

Kansas has no statewide requirements for smoke detectors in residential buildings.

CODES

Kansas has adopted portions of the 1976 Edition of the LSC 101. Most localities have adopted parts of Uniform Building Code. There is no statewide building code.

1981 BILL INTRODUCTIONS

None.

Kentucky

CURRENT STATUS

There are no statewide mandatory requirements for smoke detectors in single family residential dwellings. New hotels and motels must be equipped with smoke detectors; existing hotels and motels are exempt. New and existing apartment buildings and duplexes are required to have smoke detectors. In all new construction smoke detectors must be hard wired into the electrical system. In existing construction, smoke detectors must be powered from the main power source, i.e., an electrical outlet.

CODES

The State has adopted the Kentucky Building Code based on the BOCA Code. Within 6 months, the State fire marshal's office expects to adopt the 1981 edition. The building code is mandatory in Kentucky for all construction except single family homes. The State fire marshal's office also enforces the 1979 Edition of the LSC 101 for hospitals and other institutional care facilities. The office estimated that 75 percent of the population lives in areas which have adopted the single family portion of the code.

1981 BILL INTRODUCTIONS

None.

LOUISIANA

CURRENT STATUS

Louisiana has no statewide requirements for smoke detectors in residential buildings. Hospitals and other institutional care facilities must be equipped with smoke detectors. There is an option to use battery powered smoke detectors where there is a financial burden for the use of electricity.

Louisiana enforces the 1973 Edition of the LSC. The House introduced legislation to adopt the 1979–90 Edition of the Standard Building Code and the Standard Fire Prevention Code, but the bill died in committee.

1981 BILL INTRODUCTIONS

HB. 710 would have imposed the Southern Building Code, Congress Standard Building Code of 1979 with 1980 revisions, and its companion document, the Standard Fire Prevention Code of 1979 with 1980 revisions, as standards for construction of structures and movables. This bill died in House committee.

MAINE

CURRENT STATUS

Legislation passed in the 1981 session requires smoke detectors in new single family dwellings and new existing multiunit apartment buildings. Effective July 1, 1981, all hotels with more than 15 sleeping rooms for hire and taller than two stories must be equipped with smoke detectors. Sprinklers are required for all non-fire-resistant hotels. Hospitals, nursing homes, and day care facilities also must be equipped with smoke detectors under the LSC 101.

CODES

Maine enforces the 1976 Edition of the LSC 101 for certain occupancies.

1981 BILL INTRODUCTIONS

LB. 1573, which requires smoke detectors in all multiunit apartment dwellings and new single family residences, passed and was signed by the Governor. The bill will be effective September 18, 1981, Public Law chapter 399.

MARYLAND

CURRENT STATUS

HB. 1063, which amended article 38A, section 12A, passed into law this session. Each sleeping area in all residential occupancies must have at least one approved smoke detector.

The Maryland law includes a special provision for the deaf or hearing impaired. Upon written request by a deaf or hearing impaired person to the landlord, a special type of smoke detector, which provides a light signal upon activation, must be provided. The landlord may require a refundable deposit (which may not exceed the cost of the detector) and the tenant must be responsible for maintenance of the smoke detector. Hotels and motels must have at least one such smoke detector for each 50 units or less. (A deposit may be required under the condition described above.)

The occupant of a one, two, or three dwelling residential dwelling constructed prior to July 1, 1965, must equip the dwelling with a smoke detector by July 1, 1982.

Smoke detectors sensing either visible or invisible particles of combustion are allowed. Each detector must be operated on an alternating current primary source of electric power except those installed in residences constructed prior to July 1, 1965. Those residences may use a battery powered device.

After investigating a fire, the State fire marshal or the local investigating unit must issue a smoke detector installation order if there are no smoke detectors in the occupancy. Installation must be completed within 15 days.

CODES

The Fire Prevention Commission has the authority to amend, promulgate, and repeal the regulations of the State Fire Prevention Code. The State fire marshal is authorized to enforce the code.

1983 BILL INTRODUCTIONS

HB. 1299. Dwelling units within existing hotels and multifamily buildings must have smoke detectors by January 1, 1984.

MASSACHUSETTS

CURRENT STATUS

Every building or structure not exceeding 70 feet in height erected or altered for residential purposes must be protected with an automatic fire warning system which must feature an automatic smoke detection system. This provision applies only to building constructed or altered after January 1, 1975.

One smoke detector must be installed on the ceiling of each stairway leading to the floor above and one smoke detector must be installed outside each separate sleeping area if there are no more than two dwelling units. For a building with more than two dwelling units, smoke detectors must also be placed in all common hallways of the structure.

Effective January 1, 1982, all buildings used for residential purposes must be equipped with smoke detectors by the owner at the time of sale or transfer.

CODE

Massachusetts enforces the Massachusetts State Building Code. The Board of Fire Prevention Regulation has the responsibility of formulating and promulgating regulations.

1981 BILL INTRODUCTIONS

None.

MICHIGAN

CURRENT STATUS

Michigan has no statewide requirements for smoke detectors in residences. Through various codes governing specific occupancies, Michigan does require smoke detectors in child care centers, hospitals, nursing homes, adult foster care facilities, children's camps, and schools.

CODES

Michigan enforces the 1978 Edition of the Basic Building Code. The State also enforces the Fire Prevention Act of 1981.

1981 BILL INTRODUCTIONS

SB. 263 would require automatic smoke detection systems in new residential buildings built or used in the State. The bill died in committee.

MINNESOTA

CURRENT STATUS

Smoke detectors are required in all new and existing residential occupancies, including rental residential, hotels, apartment buildings, and college dorms. The responsibility for maintenance of smoke detectors in rentals is given to owners and managers.

There is a provision that requires smoke detectors in new construction to be wired into the electrical system. Rules have been promulgated specifying placement of smoke detectors.

CODES

Minnesota enforces the Minnesota Building Code. Local ordinances may not supersede any State ordinance.

1981 BILL INTRODUCTION

None.

MISSISSIPPI

CURRENT STATUS

Mississippi requires smoke detectors in new commercial residential buildings which include apartment buildings, hotels, and motels. There are no requirements for one and two family dwellings.

CODES

The Mississippi Fire Prevention Code was adopted in July 1978. Local jurisdictions are required to adopt the code but may include local ordinances which are more stringent than the State fire code. The code has no provisions for one and two family dwellings.

1981 BILL INTRODUCTION

None.

MISSOURI

CURRENT STATUS

Missouri has no statewide requirement for smoke detectors in residences. Smoke detectors are required in child day care facilities, day care homes, nursing homes, and hospitals. These systems must be wired into the electrical system.

CODE

There is no statewide fire code.

1981 BILL INTRODUCTIONS

HB. 593 would have required all hotels, motels, and other establishments providing lodging to transient guests to be equipped with an automatic fire detection and alarm system. In addition, each room within such hotel, motel, or establishment would have had to be equipped with an automatic smoke detector. The bill died after a committee report.

MONTANA

CURRENT STATUS

Smoke detectors are required in public buildings if over seven or eight stories; required in motels, hotels, hospitals (in every room); One smoke detector required per private residence, and in addition, one in the basement which must be connected to the main detector.

CODES

Montana enforces the 1979 Uniform Building Code and the 1979 Uniform Fire Code.

NEBRASKA

CURRENT STATUS

A smoke detector bill, LB. 296, was passed this session. Smoke detectors will be required in dwellings, apartment buildings, hotels, lodging houses, dormitories, and mobile homes (certain mobile homes and manufactured housing units are exempt). Every dwelling unit and guest room built or remodeled on or after January 1, 1982, must be provided with one or more operating smoke detectors. Every guest room

and dormitory constructed prior to January 1, 1982, must be provided with one or more operating smoke detectors on or before January 1, 1984. Dwelling units within a dwelling or apartment house constructed after January 1, 1982, must be provided with one or more smoke detectors at the time of sale or remodeling. Owners of rental dwelling units are responsible for supplying, installing, maintaining, and testing the smoke detectors. Occupants are responsible for replacing the battery or the entire unit if the unit was operable when the occupant moved into the dwelling. LB. 296A, which also passed this session, appropriates $40,000 to the States fire marshal to aid in carrying out the provisions of LB. 296.

CODES

Nebraska has adopted the 1973 Edition of LSC 101 which is not mandatory statewide. Regarding the new law, political subdivisions in Nebraska may not adopt less stringent standards.

1981 BILL INTRODUCTIONS

LB. 296, described above, is now law.
LB. 296A, described above, is now law.

NEVADA

CURRENT STATUS

Nevada required smoke detectors in newly constructed residences, new sleeping quarters of apartments and hotels, and in public buildings. Legislation passed during the 1981 legislative session requires certain existing hotels, motels, and apartment buildings to install a smoke detector in each sleeping room.

CODE

Nevada enforces the 1976 Edition of the Uniform Building Code and the 1973 Edition of the LSC 101. The State fire marshal's office has adopted the 1978 Edition of the National Fire Protection Association's National Fire Code, where necessary to supplement the UBC. Application is statewide.

1981 BILL INTRODUCTIONS

SB. 214, which would require operators and owners of existing hotels and motels with at least six rooms, and apartment buildings with at least three dwelling units to equip each room with an approved smoke detector, passed.

NEW MEXICO

CURRENT STATUS

New Mexico requires smoke detectors in all residential construction, including hotels and motels. Existing residences must comply with the code when additions exceeding $1,000 are made. Compliance is required of existing buildings if certain alterations are made. In new construction, smoke detectors must be hard wired into the electrical system. One detector must be installed in each sleeping room. Public occupancies such as schools, hospitals, office buildings, and nursing homes are required to comply with the smoke detector requirements in the LSC 101.

CODES

New Mexico has adopted the 1979 Edition of the Uniform Building Code, which is administered through the Construction Industries Division. Local jurisdictions are required to enforce this code but many adopt more stringent provisions. The 1979 Edition of LSC 101 was adopted through the authority of the State fire marshal's office.

1983 BILL INTRODUCTIONS

New bill pending to adopt the Safety Code and Flammable Liquids Code.

New Hampshire

CURRENT STATUS

Prior to the 1981 legislative session, New Hampshire required only new residential buildings of 70 feet or more in height to have smoke detection systems. A law passed 1981 session that requires automatic fire warning systems in all new single family dwelling units built after December 31, 1981. As of August 22, 1983, smoke detectors are required for multiunit homes.

CODES

The fire marshal's office enforces the 1976 Edition of the Fire Safety Code.

1981 BILL INTRODUCTIONS

HB. 262 would require automatic fire warning systems in all new single family dwelling units built after December 31, 1981. The bill was passed and signed by the Governor June 29, 1981. The law, which can be found in chapter 497, 1981 statues, will become effective August 28, 1981.

New Jersey

CURRENT STATUS

All new residential buildings and all multiple dwelling units (hotels, motels, and apartment buildings) must be equipped with smoke detectors. The New Jersey law requires smoke detectors to be wired into an active electric circuit. The owner or manager of a building is responsible for maintenance, and in some cases, testing of the smoke detection units. The guide also gives specific direction for location and placement of the smoke detection units.

CODES

New Jersey enforces the 1978 Edition of the Basic Building Code which is not subject to local administration.

1981 BILL INTRODUCTIONS

None.

New York

CURRENT STATUS

There are no statewide requirements for smoke detectors in residential buildings. Hotels and motels, which exceed three stories in height and having 75 or more sleeping rooms, must be equipped with smoke detectors. Effective January 1984, smoke detectors are required in all new construction and all areas of public assembly.

CODES

New York State has adopted the 1978 Edition of the State Fire Prevention Code, which is designed to supplement the State Building Construction Code. Municipalities must adopt a resolution or local law accepting the applicability of the codes. These codes have been adopted by about 180 communities. New York has also adopted the One and Two Family Dwelling Code which has provisions for smoke detectors in new single, family dwellings and multiple dwellings. About 725 communities have adopted this code.

1981 BILL INTRODUCTIONS

None.

North Carolina

CURRENT STATUS

North Carolina requires smoke detectors in all new residential buildings through a mandatory statewide building code. Recent legislation requires owners of high-rise buildings to install smoke detection systems.

CODES

North Carolina has a mandatory State building code (based on the National Building Code of Canada) with stringent amendments for high-rise buildings which was adopted by the North Carolina Building Code Council in 1979. The code was challenged in court and stricken because of questions of legislative intent in giving the council the authority to adopt codes. This session the legislature passed a bill specifically including the high-rise building amendments to the State code.

1981 BILL INTRODUCTIONS

SB. 520, which would incorporate the building code titled "Special Safety to Life Requirements Applicable to Existing High-Rise Buildings" into the general statutes of North Carolina, has passed. The effective date was June 29, 1981.

North Dakota

CURRENT STATUS

There are no requirements for smoke detectors in residential buildings. Hotels and motels must have smoke detection systems in each sleeping room. For the hearing impaired, at least one sleeping room must be equipped with a smoke detector capable of producing 85 decibels of sound at 10 feet and capable of flashing a 250 watt bulb for 5 minutes. Hospitals are also required to have smoke detection systems.

CODES

The State fire code is based on the LSC 101. The State building code, which is mandatory throughout the State, is based on the 1978 Edition of the Uniform Building Code. Both codes may be amended by localities as long as the amendments meet or exceed those of the State building code. Provisions for hospitals are found in the North Dakota Administrative Code.

1981 BILL INTRODUCTIONS

None.

Ohio

CURRENT STATUS

Ohio has no smoke detector requirements for one, two, and three family residences. New and existing sleeping rooms in apartment buildings and hotels and motels built after 1972 must be equipped with smoke detectors. All buildings over 75 feet in height are required to have smoke detection systems.

CODES

Ohio has a mandatory statewide building code based on the BOCA Building and Fire Codes. The code is part of the Ohio statutes. Sections of the BOCA Code which conflict with the provisions of the Ohio Revised Code have been deleted. Local jurisdictions can adopt more stringent requirements than the State code. Local jurisdictions that adopt the State code may enforce it. Where the local jurisdiction does not adopt the code, the State enforces the code.

1981 BILL INTRODUCTIONS

None.

OKLAHOMA

CURRENT STATUS

Oklahoma has no smoke detector requirement for residences. Smoke detectors are required in hospitals and other institutional care facilities.

CODES

Oklahoma is planning to adopt the 1981 Edition of BOCA, but the requirements relating to smoke detectors will not be adopted. The State fire marshal's office has adopted the 1981 Edition of the LSC 101 with all its smoke detector requirements.

1981 BILL INTRODUCTIONS

None.

OREGON

CURRENT STATUS

New residential buildings must be equipped with smoke detectors. All structures undergoing remodeling which costs $1,000 or more must be equipped with smoke detectors. In addition, all existing residential buildings, except owner-occupied single family homes must be retrofitted. All rental dwelling units including hotels and dormitories must comply. Owner-occupied single family housing must be retrofitted upon change of ownership. Details for placement and maintenace are included.

CODES

The State building code is a mandatory minimum/maximum code. All buildings, except residential buildings with less than three units, are regulated by the Code. This code is based on the 1979 edition of the Uniform Building Code. The Oregon revised statutes gave the fire marshal's office the authority to adopt rules and regulations. Under an administrative rule, the fire marshal's office has adopted the latest edition of the National Fire Code.

1981 BILL INTRODUCTIONS

None.

PENNSYLVANIA

CURRENT STATUS

There are no requirements for smoke detectors applicable to residential housing built onsite. Manufactured or industrialized housing must be equipped with smoke detectors as must personal care homes, boarding homes, and group homes (alcohol and juvenile treatment centers).

CODES

The Industrialized Housing Division enforces the 1978 Edition of the Basic Building Code for manufactured or industrialized housing. The other requirements are through the Pennsylvania Fire and Panic Regulations which were formalized in May 1981.

1981 BILL INTRODUCTIONS

None.

RHODE ISLAND

CURRENT STATUS

All new and converted buildings used for residential occupancy must be equipped with smoke detection systems which must be hard wired into the electrical system. Child day care centers, adult sheltered care homes, and places of public assembly must also be equipped with smoke detection systems. Existing structures must be retrofitted when a change in use or type of occupancy occurs.

CODES

The State fire marshal's office enforces the Rhode Island State Fire Safety Code which was enacted into law by the general assembly. The fire marshal's office is given the responsibility of new residential construction. Existing residential buildings are the responsibility of local minimum housing officers who enforce the Occupancy and Maintenance Codes. The smoke detector requirement in the 1975 Edition of the BOC Code is used for high rise buildings. The smoke detector requirements of the 1973 Edition of the LSC are used for hospitals and nursing homes.

1981 BILL INTRODUCTIONS

H. 5013, which would have required all existing one, two, and three family dwellings and all existing apartments with less than eight living units to be equipped with smoke detector systems when a title is transferred as the result of a sale, did not pass.

H. 5538 would have required every building containing eight or more living units with independent cooking and bathroom facilities to have a fire alarm system installed. One provision would have required the installation of smoke detectors with alternating current primary sources of electric power, taken from a dependable commercial light and power supply source in each separate sleeping area. The bill did not pass.

H. 5055 would require all new and converted residential buildings to be equipped with a smoke detection system. In addition, all existing residential buildings exceeding one story or floor would have to be equipped with smoke detection systems on each floor. The bill did not pass.

South Carolina

CURRENT STATUS

Every dwelling and dwelling unit within a hotel, motel, condominium, and apartment house must be provided with a smoke detector. Specific guidelines for placement and location are provided. There are no requirements for one and two family dwellings.

CODES

South Carolina enforces the 1976 Editions of the Southern Standard Building Code and the Standard Fire Code. Municipalities may adopt more stringent regulations if needed.

1981 BILL INTRODUCTIONS

None.

South Dakota

CURRENT STATUS

There are no statewide requirements for smoke detectors in residential dwellings. The fire marshal's office highly recommends smoke detection systems be installed in apartment buildings, but this is voluntary. The health department enforces requirements for smoke detectors in hospitals, nursing homes, and other institutional facilities.

CODES

South Dakota has adopted the public building portion of the 1979 Edition of the Uniform Building Code. (This code does not cover private dwellings.) The fire marshal's office is trying to adopt the UBC in its entirety, but this cannot be done before July 1, 1982. The health department enforces portions of the 1981 Edition of the LSC 101.

1981 BILL INTRODUCTIONS

None.

TENNESSEE

CURRENT STATUS

There are no requirements for smoke detectors applicable to any type of residential buildings. Only child day care centers are required statewide to have smoke detection systems.

CODES

The State fire marshal's office enforces the 1973 Edition of the LSC 101. The State has also adopted the 1976 Edition of the Standard Building Code, and the National Fire Protection Code.

TEXAS

CURRENT STATUS

Until this legislative session, Texas had no statewide requirements for smoke detectors. Legislation, passed this session, will require smoke detectors in all rental or leased dwelling units constructed after Septmber 1, 1981. Nursing homes and hospitals must have smoke detectors. There are no requirements for hotels and motels.

CODES

There is no statewide fire or building codes in Texas. Nursing and convalescent homes are regulated by the Nursing and Convalescent Home Division of the Texas Department of Health which enforces the LSC 101.

1981 BILL INTRODUCTIONS

HB. 245 would have required a person owning a multiple-residence building and renting or leasing one or more units to others to install an approved fire detection and smoke alarm systems that provides smoke warning to all residents of the building in each hallway connecting separate units. The bill was passed by the House but died in the Senate.

HB. 2046 would require all dwelling units in rental or leased propety constructed after September 1, 1981, to have at least one smoke detector installed by the landlord outside of each separate bedroom in the immediate vicinity of the bedroom. If the dwelling is designed to be a single multipurpose room to be used for dining, living, and sleeping, the smoke detector shall be located inside the room rather than outside. The bill has become law and will be effective September 1, 1981.

UTAH

CURRENT STATUS

Utah has no statewide requirements for smoke detectors in residential buildings. Hospitals, nursing homes, schools, places of public assemblage, and State-owned buildings must be equipped with smoke detectors.

CODES

Utah enforces the 1979 Editions of the Uniform Building Code, the Uniform Fire Code, and the Mechanical Code. The fire codes are not mandatory in the State.

1981 BILL INTRODUCTIONS

None.

VERMONT

CURRENT STATUS

Vermont has no requirements for smoke detectors in residential buildings.

CODES

Vermont enforces the 1976 Edition of the LSC 101 which covers public buildings.

1981 BILL INTRODUCTIONS

None.

VIRGINIA

CURRENT STATUS

Virginia requires smoke detectors in new residential construction. As of July 1, 1981, permissive legislation allows localities to adopt provisions requiring smoke detector systems to be installed in buildings retroactively.

CODES

Virginia has adopted the 1978 Edition of the Basic Building Code which is a mandatory minimum/maximum code. Virginia also has a fire safety law which has no provisions for smoke detectors. The code is currently under review and the State fire marshal's office may petition the legislature to revise the codes and the fire safety law.

1981 BILL INTRODUCTIONS

None.

WASHINGTON

CURRENT STATUS

The State of Washington requires smoke detectors in all new residential buildings. Effective December 31, 1981, smoke detectors will be required in all existing buildings other than owner-occupied, that is, all rentals will have to be equipped with smoke detectors.

CODES

Washington has included part of the 1976 Uniform Building Code in the State building code which is mandatory statewide.

1981 BILL INTRODUCTIONS

None.

WEST VIRGINIA

CURRENT STATUS

Smoke detectors are required in corridors of apartment buildings and in nursing homes, hospitals and other institutional occupancies.

CODES

The State fire marshal's office enforces the State Fire Code which incorporates parts of the 1979 National Fire Code. The code excludes one and two family dwellings.

1981 BILL INTRODUCTIONS

None.

WISCONSIN

CURRENT STATUS

All new residential buildings are required to be equipped with smoke detectors. Mobile homes and manufactured housing must also be equipped with smoke detectors.

CODES

Two codes regulate buildings in Wisconsin. The One and Two Family Dwelling Code is administered through the Department of Labor, Industry, and Human Services. This code is also used for mobile and manufactured homes. Commercial build-

ings, including apartment buildings, are under the jurisdiction of the Department of Labor.

1981 BILL INTRODUCTIONS

None.

WYOMING

CURRENT STATUS

Wyoming requires smoke detectors in all new residential buildings, including hotels and motels. Existing buildings must be retrofitted when remodeling requires a building permit and costs more than $1,000 or when one or more sleeping rooms are added to the building.

CODES

Wyoming has adopted the 1979 Uniform Building Code which is mandatory throughout the State. Municipalities may adopt more stringent restriction.

DISTRICT OF COLUMBIA

CURRENT STATUS

Smoke detectors are required in all residential dwellings effective under legislation passed in 1980.

CODES

The District of Columbia follows the title 7, Fire Prevention code.

ITEM 2. LETTER FROM NANCY HARVEY STEORTS, CHAIRMAN, U.S. CONSUMER PRODUCT SAFETY COMMISSION, TO SENATOR JOHN HEINZ, CHAIRMAN, SENATE SPECIAL COMMITTEE ON AGING, DATED AUGUST 9, 1983

DEAR MR. CHAIRMAN: When I testified before your committee on July 28, 1983, the subject of Commission jurisdiction over cigarettes arose. The following is additional information on this subject that I am submitting for the record:

(1) The Consumer Product Safety Act (CPSA), enacted in 1972, excludes tobacco and tobacco products from the definition of "consumer product." 15 U.S.C 2052(a)(1)(B). However, the CPSA also transferred to the newly created Consumer Product Safety Commission authority to regulate certain household products under the Federal Hazardous Substances Act (FHSA). 15 U.S.C. 1261, et seq. At the time of its transfer, the FHSA contained no express exclusionary provision pertaining to tobacco products.

(2) In February 1974, the American Public Health Association and Senator Frank Moss petitioned the Commission to regulate high tar cigarettes under the FHSA. This petition asserted that such cigarettes met the FHSA definitions of "hazardous substance" and "toxic" (applicable to substances having "the capacity to produce personal injury or illness to man through ingestion, inhalation, or absorption through any body surface"). 15 U.S.C. 1261 (f) and (g). In May 1974, the Commission decided by a vote of 3 to 2 that it lacked jurisdiction and authority to take the action requested in the petition.

The petitioners sued the Commission in the U.S. District Court for the District of Columbia and Judge Gasch decided in April 1975, that the Commission did have jurisdiction under the FHSA to regulate cigarettes. *American Public Health Association* v. *CPSC*, No. 74-1222 (D.D.C., April 23, 1975). The Commission did not appeal this decision, but an intervening party, representing the tobacco industry, filed a notice of appeal. In view of subsequent congressional action on the issue of FHSA jurisdiction over cigarettes (see item (4) below), a ruling on the appeal proved unnecessary.

(3) In May 1974, the National Association of Furniture Manufacturers and others requested the Commission to study the feasibility of producing a self-extinguishing cigarette. These same parties, the following month, petitioned the Commission to ban the introduction into interstate commerce of cigarettes that did not self-extinguish.

In September 1974, the Commission denied the petition on the grounds that, among other things, it lacked jurisdiction to regulate cigarettes as an ignition source under the CPSA, the FHSA, or the Flammable Fabrics Act. The petitioners sued the Commission in November 1974, in the U.S. District Court for the District of Columbia. This case was also heard by Judge Gasch who dismissed the complaint in June 1975, but stated that the petitioners would be free to raise the issue of a study of cigarettes at such time as an upholstered furniture standard was issued. *National Association of Furniture Manufacturers* v. *CPSC*, No. 74-1742 (D.D.C., June 18, 1975).

(4) In 1976, Congress amended the FHSA to exclude tobacco and tobacco products from the term "hazardous substance." Section 3(c) of the Consumer Product Safety Commission Improvements Act of 1976 (Public Law 94-284), effective May 11, 1976. The legislative history of the 1976 Improvements Act shows that some consideration was given to permitting regulation of tobacco products to the extent they present an unreasonable risk of injury as a source of ignition. The Senate version of the bill took this approach. However, the conference report specifically provided that "[t]he conference substitute does not authorize the Consumer Product Safety Commission to regulate tobacco and tobacco products as a source of ignition." H.R. Rep. 94-1022, 94th Cong., 2d Sess. 16.

(5) Since 1980, a number of bills have been introduced into the Congress to provide the Commission with jurisdiction over cigarettes and little cigars for the purpose of regulating them as an ignition source of smoldering upholstered furniture and mattress fires. The Commission has supported the purpose of these bills. As examples, a June 2, 1980 letter to Senator Cannon, a September 23, 1981 letter to Representative Dingell, and a May 31, 1983 letter to Representative Dingell, all take this position in support of limited CPSC jurisdiction over cigarettes (see attachments A, B, and C).[1]

If you have any questions, please call me at 634-7740.

Sincerely,

NANCY HARVEY STEORTS, *Chairman.*

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[1] Retained in committee files.

COVINGTON & BURLING
1201 PENNSYLVANIA AVENUE, N. W.
P. O. BOX 7566
WASHINGTON, D. C. 20044

(202) 662-6000
WRITER'S DIRECT DIAL NUMBER

662-5650

DANIEL M. GRIBBON
STANLEY L. TEMKO
DON V. HARRIS, JR.
WILLIAM STANLEY, JR.
WEAVER A. DUNNAN
EDWIN M. ZIMMERMAN
JEROME ACKERMAN
HENRY R. SAILER
JOHN H. SCHAFER
ALFRED H. MOSES
JOHN LIMOINE ELLICOTT
DAVID E. MCGIFFERT
H. EDWARD DUNKELBERGER, JR.
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THOMAS S. WILLIAMSON, JR.

R. THOMAS AUSTERN
FONTAINE C. BRADLEY
EDWARD B. IRLING, JR.
HOWARD L. WESTWOOD
CHARLES A. HORSKY
JOHN T. SARIENZA
JAMES H. MCGLOTHLIN
ERNEST W. JENNES
COUNSEL

JOHN SHERMAN COOPER
OF COUNSEL

August 24, 1983

DELIVERED BY HAND

The Honorable John Heinz
Chairman, Special Committee on Aging
277 Russell Senate Office Building
Washington, D.C. 20510

Dear Senator Heinz:

I regret that there was not sufficient time during the July 28 hearing before the Special Committee on Aging to permit a reasonably complete and balanced discussion of the technical and scientific issues presented by efforts to reduce the number of cigarette-related fires. Contrary to the impression that may be conveyed by the hearing transcript, the tobacco industry has been in the forefront of efforts to seek solutions.

In addition to the fire prevention education programs that the tobacco industry has undertaken or supported, which I did have an opportunity to mention at the July 28 hearing, individual tobacco companies have independently conducted research focusing on the cigarette's ignition potential. At the March 21, 1983, hearing before Representative Waxman's Subcommittee on Health and the Environment, for example, Dr. A. W. Spears, Executive Vice President for Operations and Research at Lorillard, emphasized that his company views cigarette-related fires "as a most serious problem and * * * we are and have been addressing it."

Appended to my written statement at the July 28 hearing was a detailed analysis by Dr. Spears of the major

technical and scientific problems that must be overcome to reduce the cigarette's ignition potential. An earlier version of that analysis was provided to Representative Waxman on November 28, 1981. A slightly expanded version, in the form appended to my written statement, was submitted to the House Subcommittee on Health and the Environment on March 21, 1983. Even a quick reading of Dr. Spears' analysis should confirm the seriousness of the technical and scientific problems that the tobacco industry faces in attempting to modify the cigarette to serve fire-safety objectives -- as well as the seriousness of the companies' resolve to investigate all possible solutions.

A further documented example of the ongoing work by individual tobacco companies in this area relates to a series of "self-extinguishing" cigarette patents held by an inventor named Charles Cohn for the so-called "Colite" process. As recently as a year ago, some of the major proponents of "fire-safe" cigarette legislation were pointing to the "Colite" process as the desired solution to cigarette-related fires. The tobacco industry was being chastised, at the same time, for failing to adopt the Colite "solution."

In fact, the Colite process, which involves painting cigarettes with a sodium silicate solution, has been subjected to careful scientific analysis -- by individual cigarette companies and others -- and has been found <u>not</u> to present a desirable approach. Tests conducted for the former Department of Health, Education and Welfare by the Naylor-Dana Institute, for example, concluded that --

> "[i]n summary, the 'Colite' treatment of cigarette paper results in a cigarette which has a low burning rate, requires more puffs to reach standard butt length and, therefore, delivers more 'tar' (TPM), nicotine, carbon monoxide and carbon dioxide in the mainstream smoke * * *." ("Analysis of Mainstream and Sidestream Smoke of Cigarettes Treated With Colite," page 6 (copy attached))

Those results prompted HEW to advise Mr. Cohn that "further development or analysis of [cigarettes treated by the Colite process] is not warranted on our part" (Letter from Dr. Gio

B. Gori, National Cancer Institute, to Mr. Cohn, dated December 21, 1973 (copy attached)).

Tests of the Colite process by R. J. Reynolds Tobacco Company and the National Bureau of Standards produced similarly negative results. The report of those tests lists a number of serious deficiencies in the Colite process that preclude its use. These include anticipated manufacturing difficulties (so far as we are aware, Mr. Cohn's sodium silicate solution has never been applied successfully by machine), unacceptable taste considerations, unaesthetic ash appearance, possible problems in shelf life under some climatic conditions and substantially increased delivery of smoke constituents (i.e., nicotine, "tar" and other particulate and gas phase constituents). A copy of the R. J. Reynolds test report is attached.

I am also enclosing, in accordance with your request at the July 28 hearing, a list of pertinent scientific and technical articles that have been published by tobacco company scientists during the past several years. These articles are representative of the literature addressing important aspects of the cigarette burning process. The on-going proprietary research being conducted in this area by the individual tobacco companies is, of course, work in addition to the research and investigation that is described in Dr. Spears' analysis and in the published literature.

I am convinced that the unhappiness expressed periodically by proponents of "fire-safe" cigarette legislation with the individual cigarette companies' efforts in this area is simply a consequence of the fact that, to date, no company has been able to make the needed scientific breakthrough. But I can and do assure you on behalf of the individual companies that this failure is in no sense attributable to a lack of effort or will. It is, rather, clear confirmation of the difficulty of the technical and scientific problems that are involved.

An alternative claim sometimes advanced by proponents of "fire-safe" cigarette legislation, in an effort to justify the imposition of fire-safety standards, concerns purported differences in the ignition potential of cigarettes already on the market. At the July 28 hearing, Mr. Andrew McGuire asserted that tests at the National Bureau of Standards and by the California Bureau of Home Furnishings have confirmed

that at least one type of cigarette -- the Sherman MCD variety -- is relatively "fire safe." Mr. McGuire went on to suggest that fire-safety standards be set for all commercial cigarettes using the Sherman MCD as the point of reference.

The time constraints at the July 28 hearing were such that I was unable to point out that the pertinent documents do not support Mr. McGuire's assertion that there are significant differences in the ignition potential of individual brands of cigarettes. Before releasing its final report on the testing to which Mr. McGuire referred at the hearing, the Bureau of Standards took the extraordinary step of issuing a fact sheet that emphasized that it was "not testing individual name brand cigarettes in a systematic way" -- and that its testing program was directed instead at developing a "reliable method for measuring the tendency of cigarettes to ignite."

As the NBS researchers emphasized in their final report, a great deal of additional work must be done before we will know whether the results produced by the NBS candidate test method can be relied upon to predict the behavior of individual cigarette brands in real-world conditions. In addition to this obviously pivotal question, which goes to the external validity of the candidate test method, the NBS researchers identified in their final report a host of questions that they had not been able to investigate or resolve concerning the internal validity and reliability of their proposed test method. As the NBS researchers attempted to make clear, each of those questions has to be pursued and answered satisfactorily before the candidate test method actually is used for its intended purpose.

Thus, the NBS testing program does not justify Mr. McGuire's assertion that there are significant (i.e., real-world as opposed to laboratory-induced) differences in the ignition potential of individual brands of cigarettes. To accept Mr. McGuire's assertion, one has to ignore the stated purpose of the NBS testing program and the NBS researchers' own explanation of the meaning of their test results. For your convenience, a copy of the NBS Fact Sheet and final report are attached.

While the NBS researchers emphasized that their work should not be interpreted as providing comparative data on the behavior of individual brands of cigarettes in

real-world conditions, at least one aspect of that work does cast doubt on the efficacy -- purely from a fire-safety perspective -- of the entire concept of a "self-extinguishing" cigarette. Significantly, the NBS researchers concluded, with respect to that issue, that "[s]elf extinguishment time alone will not define the propensity of a cigarette to ignite upholstered furniture" (NBS Final Report, page 30). The NBS researchers also noted that "[s]elf-extinguishing time for a cigarette will depend on the substrate on which it rests" (ibid.). They pointed out, in addition, that ignition time for many heavier fabrics may be as short as one minute -- rather than the "3, 4, 5, 10 minutes" (Hearing Tr. 76) mentioned by Mr. McGuire during the hearing (see NBS Final Report, pages 7 and 30).

The brief film presentation of a single test performed at the California Bureau of Home Furnishings involved a mock-up configuration using only one type of fabric, one type of filling material (rather than full-scale pieces of upholstered furniture), a single placement location for the test cigarettes, and a laboratory set of environmental conditions. This test certainly does not warrant the conclusion that there are significant differences in cigarette ignition potential. The previously mentioned NBS report provides ample documentation of that fact. The NBS final report points out, for example, that --

- "the various construction parameters of foam, such as choice of chemicals, density, cell structure, etc. can affect cigarette ignitability." (Final Report, page 5.)

- "the term 'self-extinguish' is not easily defined. Whether a cigarette self-extinguishes or not depends on the nature of the substrate which it contacts. That is, some cigarettes self-extinguish in air but may cause smoldering ignition of heavy cellulosic fabrics over cotton batting or foam. Self-extinguishment of the cigarette itself has been observed to occur for certain cigarettes on some fabric/foam substrates while the substrates continued to smolder." (Final Report, page 8.)

- "the California Bureau of Home Furnishings * * * [has] had great difficulty in the

> procurement of [standard filling materials] in a reproducible form. Upholstery fabrics, foam, and batting have thus far not been produced to the close tolerances needed for use in tests of the kind envisaged here [i.e., involving the laboratory ranking of individual brands of cigarettes in terms of their ignition potential], and the market for such standard materials would generally be too small to make it worthwhile to introduce costly production controls only for this purpose." (Final Report, page 17.)

- "[i]t would be desirable to check the cigarette rankings with a wider range of fabrics and filling materials since there are thousands of fabric and filling combinations which previous work * * * has shown to be susceptible to cigarette ignition. Similarly, the ranking of cigarettes may be affected by furniture configurations, such as crevices between cushions and sides or backs forming various angles, concave cushion surfaces, etc." (Final Report, page 27.)

For your information, I also have attached a letter from Dr. Gio B. Gori, formerly the Acting Deputy Director of the Division of Cancer Cause and Prevention, National Cancer Institute, to Dr. John Krasny of the National Bureau of Standards. Dr. Gori notes in that letter, among other things, that --

> "characteristics other than [cigarette] paper porosity will modify combustion rates and temperatures. Significant among them is the level of natural nitrates, which could vary from batch to batch and year to year, thus making it difficult to rank cigarette brands, or even to develop and standardize an analytic procedure."

The essential point made by the Bureau of Standards researchers as well as by Dr. Gori is, of course, the unreliability of any conclusions based on a single set of test conditions -- particularly when it has been demonstrated

repeatedly, as it has so far as cigarette ignitions are concerned, that altering any number of test conditions can affect the results. It is precisely that complexity that has stood in the way of developing a reliable measure of the ignition potential of individual brands of cigarettes. That complexity also precludes our reaching any firm conclusions on the basis of the film that was used at the July 28 hearing.

One further point that was raised at the July 28 hearing that requires a brief response concerns the truly heartening success of the European countries in reducing their rate of accidental fires and fire deaths. As the attached letter from Mr. Philip Schaenman, formerly the Associate Administrator of the United States Fire Administration, makes clear, the kind of fire prevention/fire prevention education programs being employed in Europe -- which do not involve efforts to alter the cigarette -- deserve very serious attention in the United States. Those programs have resulted, as I mentioned at the hearing, in a rate of accidental fires and fire deaths between one-fifth and one-half the level that exists in the United States. These rate comparisons have been confirmed by Professors Banks and Bardin of Georgia Tech University (see International Comparison of Fire Loss, Fire Technology (August 1982), pages 268-279 (copy attached)). Although Mr. McGuire professed to be unimpressed with the success of the European countries in this area, the fire service professionals in this country quoted in Mr. Schaenman's letter obviously take a decidedly different view.

Let me end by assuring you again that the tobacco industry shares your concern about the number of accidental fires that are occurring in this country. The Tobacco Institute as well as the individual tobacco companies are, I believe, at the forefront of efforts to find solutions -- and will continue to seek the solutions that we all desire. We believe that one important step in that search is a comprehensive federal study of cigarette-related fires and associated scientific and technical issues relating to the cigarette itself. Our goal, in proposing that such a study be undertaken, is to provide a forum in which the pertinent scientific and technical issues can be investigated without the understandable emotion that often has prevented a reasoned dialogue and has stood in the way of real progress.

Sincerely,

John P. Rupp

Attachments
ceb

A TECHNICAL ANALYSIS OF THE PROBLEMS RELATING TO UPHOLSTERED FURNITURE AND MATTRESS FIRES RELATIVE TO PROPOSED CIGARETTE LEGISLATION INCLUDING A REVIEW OF RELEVANT PATENTS

SUBMITTED TO THE SUBCOMMITTEE ON HEALTH AND THE ENVIRONMENT OF THE COMMITTEE ON ENERGY AND COMMERCE FOR ITS HEARING ON H.R. 1880

A. W. Spears

March 21, 1983

Introduction

Recently, much attention has been focused on the association between the misuse of smoking materials and accidental fires. All agree that any fire is a regrettable occurrence, but in discussing the science of the subject, it is important to seek solutions that are consistent with the nature of the problem. The number of fires that have been reported to be related to smoking materials is rare relative to the 620 billion cigarettes and 5 billion cigars sold last year in the United States. Smoking materials as a category include matches, lighters, cigarettes, cigars, pipes, and non-tobacco substitutes. Based upon the number of fires in residential occupancies reported by the Federal Emergency Management Agency[32] as smoking material related, only one out of 10 million consumed smoking articles could have been involved in such a fire. A rare event cannot be described by normal statistics where each cigarette or cigar consumed has an equal probability of being involved in a fire, or only a small distribution of smoking products with extreme properties produce fires. Consequently, solutions that depend on normal statistical assumptions are likely to fail.

In the case of a rare occurrence, a series of events must occur in a structured time sequence, and, here, the events may be referred to as a fire scenario. The scenario is thought to involve careless smoking acts where the smoker

is under a state of impaired awareness such as that produced by alcohol and drugs. The smoking article must be dropped or placed on an ignitable substrate with sufficient fuel to produce an ignition. The heat transfer and heat loss must be such that ignition temperatures are reached. The entire process must go unnoticed for some considerable time before high smoke concentrations or flaming combustion develop. For the purposes of discussion throughout this paper, the term substrate is used to mean any and all material with which a burning cigarette is in contact, including fabric, filling, welt cord, and decking as in the case of upholstered furniture.

Two approaches toward interrupting this type of scenario have been pursued by the legislative and regulatory authorities in this country. They are based upon the statistic that a high percentage of the reported smoking material related fires occur in the home and involve upholstered furniture and mattresses. The first approach has been to alter the properties of upholstered furniture and mattresses so that they are no longer ignitable by cigarettes under a variety of full-scale laboratory tests. The second approach is to alter cigarettes and cigars so that they self-extinguish or have a "reduced propensity" to cause upholstered furniture and mattress ignition. Propensity has a normal statistical connotation, and it must be remembered that normal statistics frequently do not apply to rare events. As we discuss the information that is available and the properties of the

cigarette, it will become clear that legislation in this area will not stimulate a technical solution to the fire scenario.

Discussions of the so-called self-extinguishing cigarette or "low propensity to ignite" cigarette often have included the idea that technology is available to permit the manufacture of such cigarettes and that as a result there would be a major reduction in fires reportedly caused by smoking materials. The bases for this suggestion are that there are numerous patents describing a variety of processes and devices that make such claims, and tests on commercial cigarettes have been conducted which have reportedly demonstrated significant differences between commercial cigarettes.

There are, in fact, several devices and processes that would cause cigarettes to extinguish when not being puffed, but there are fundamental objections to each which prevent their actual use. The differences between most commercial cigarettes are not significant relative to the fire scenario, and, unfortunately, there is no way using present technology that a satisfactory cigarette can be produced which would provide a solution to the fire scenario. Why this is so cannot be easily understood and appreciated without some understanding of the complexities of the cigarette itself. There is a widespread misconception, which is reflected in the patent literature, that the cigarette manufacturing process involves little more than wrapping shredded tobacco with a piece of paper, and then

perhaps affixing a cigarette filter. In fact, the modern cigarette, while simple in appearance, is exceedingly complex in design and involves the application of highly sophisticated technology.

The Commercial Cigarette and Some of Its Properties

The typical American cigarette consists of a blend of tobaccos or tobacco types known as Flue-cured, Burley, and Oriental. The major additives are humectants such as glycerin and propylene glycol, sugars, and various flavor extracts. Nothing is added to tobacco in order to promote or retard burning. Although tobaccos differ in their burning properties because of their varying densities and chemical compositions, there is relatively little difference in burning properties among the blends that have been formulated for commercial cigarettes.

The linear static burn rate of the cigarette is defined as the time required for a fixed distance of the tobacco column to be consumed without puffing when the cigarette is in the horizontal position, totally exposed to air but free from drafts. The linear static burn rate of the cigarette depends on a number of factors including tobacco packing density, tobacco particle size, tobacco composition, circumference of the cigarette, moisture content of the cigarette, porosity of the cigarette paper, and composition of the cigarette paper. The mass static burn rate is defined as the mass of tobacco burned per unit time. It, too, depends on these same parameters

except for packing density. Mass burn rate does not vary with packing density.

Rice, et al[1] have related the linear and mass static burn rates to each other and to the various cigarette construction parameters over the commercial range of these parameters. They have produced the following expression relating mass burn rate of a reference or measured cigarette to that of other cigarettes constructed from the same tobacco but with different parameters of construction.

$$(1) \quad B = \frac{C}{Cw} [Bw + 0.7 (Mw - M) + 0.34 (Pw - P) - 0.17 (Tw - T)]$$

where B = "predicted" rate of burn, mg/minute

Bw = rate of burn of "measured" cigarette, mg/minute

C = circumference of "predicted" cigarette

Cw = circumference of "measured" cigarette

M = moisture content of "predicted" cigarette

Mw = moisture content of "measured" cigarette

P = paper porosity of "predicted" cigarette

Pw = paper porosity of "measured" cigarette

T = cuts per inch of tobacco of "predicted" cigarette

Tw = cuts per inch of tobacco of "measured" cigarette

By correcting for packing density, equation 1 can be readily modified to enable the prediction of linear rate of burn (equation 2).

$$(2) \quad B_L = \frac{L}{W} \frac{C}{Cw} [Bw + 0.70 (Mw - M) + 0.34 (Pw - P) - 0.17 (Tw - T)]$$

where L = length of "predicted" cigarette (tobacco portion only)

W = weight of "predicted" cigarette (tobacco portion only)

B_L = linear rate of burn, as mm/minute

The linear static burn rate of most commercial cigarettes manufactured in the United States falls between 5 and 7.5 mm/min. The mass burn rates vary between about 45 and 70 mg/min. A cigarette will self-extinguish when dropped onto a surface (conducting or non-conducting) if its burn rate is below a certain threshold. The closer the linear static burn rate is to the point of extinction (2-3 mm/min.), the more likely it is to self-extinguish when dropped, since when the cigarette is in contact with the surface, oxygen influx is occluded and heat losses from the burning cone may be increased. The tobacco packing density varies between 0.185 and 0.265 g/cc. The moisture content of commercial cigarettes is about 12%, and the tobacco particle size is similar over the spectrum of commercial cigarettes. Most cigarettes have a circumference of about 25 mm, but one brand is manufactured with a circumference of only 21 mm. From equations 1 and 2, it may be gleaned that as circumference decreases, linear static burn rate increases and mass static burn rate decreases. When packing density is decreased, linear static burn rate is increased and mass burn rate is unchanged. As the cut width of the tobacco and moisture content increase, both burn rates decrease, and increased porosity of the paper increases the burn rate. With respect to tar yield and other smoke component yields, increases in cigarette circumference and tobacco packing density would result in increases of these mainstream smoke components. Decreases in paper porosity and tobacco cut width would also increase these mainstream smoke components.

The water content of tobacco is important to the static burn rate. If the water content were raised to 25%, moderately burning cigarettes would be likely to self-extinguish while cigarettes containing about 7% water are likely to burn about 50% faster than those containing the customary amount of water or about 12%. However, cigarettes with a high water content (i.e. above 12 to 13%) would not be in equilibrium and would lose moisture under normal storage conditions. Furthermore, tobacco containing more than 17% water is susceptible to mold and would be rendered unsmokable after a short period of storage.

A representative cigarette contains about 800 mg tobacco with a heat of combustion of about 3800 calories/gram.[2] In reality, however, the typical smouldering cigarette radiates only about 1100 calories/gram because of incomplete oxidation and the heat required to propagate smouldering. The principal reactions[3,4,5] that produce heat involve the combustion of carbon to carbon monoxide with a heat of combustion (ΔH) of 26.9 kilocalories, the oxidation of carbon to carbon dioxide with a ΔH of 96.4 kilocalories, and the oxidation of carbon monoxide to carbon dioxide with a ΔH of 65.8 kilocalories. Cigarettes burn with peak temperatures during the puffing cycle in the range of 850°C to 900°C. During the non-puffing or free-burning cycle, the maximum surface temperatures drop to about 700°C.[6] Since the principal exothermic and endothermic reactions are similar for each tobacco type, and since the heat loss

through radiation is proportional to the fourth power of temperature, one cannot expect to significantly alter the temperature of the free-burning cigarette. In fact, experimental attempts to modify the peak temperature by the addition of endothermic and exothermic agents to the tobacco indicate that a temperature change of about 50°C is the maximum obtainable.[7,8]

Cigarette paper, in addition to acting as a container for the tobacco, interacts with the burning tobacco in a rather complex manner. The ash formed by the paper can influence the porosity of the fire cone and, to some extent, its thermal insulation. The nature of the ash is itself influenced by the composition of the cigarette paper. The principal function of additives to the cigarette paper is to ensure that the cigarette paper and the tobacco burn at a complementary rate. If the smoulder rate of the paper is reduced, less air flows in and around the surface of the burning cone, retarding oxidation of the burning tobacco and causing an increase in the production of carbon monoxide and pyrolytic reaction products. Conversely, as the burn rate of the paper is increased, more oxygen is admitted along the char line of the cigarette, promoting more complete combustion -- and decreasing the production of carbon monoxide and pyrolytic reaction products. The operation range of this variable (i.e., cigarette paper additives) is limited to about a 20 percent increase or decrease in the linear static burn rate.[9] Excursions beyond this limit would cause cigarettes to burn in an extremely inefficient manner or at an excessively high rate.

An additional factor affecting the static burn rates of the cigarette is the porosity of the cigarette paper. The unburned paper on the tobacco column, depending upon its porosity, provides a membrane through which lower molecular weight smoke products can diffuse during the puffing cycle. Similarly, a high porosity paper permits added air to enter the tobacco column during puffing, diluting the smoke that reaches the smoker. Thus, the porosity of the paper becomes a modifier of smoke composition. Cigarette paper contains calcium carbonate and either ammonium phosphate or a mixture of sodium and potassium citrates. These substances, in combination with the flax-derived cellulosic fiber, are the primary determinants of cigarette paper porosity.

If one attempts to modify the static burn rates of the cigarette by manipulation of cigarette paper additives or paper porosity to the point at which the cigarettes will self-extinguish, the result will be a significant increase in mainstream smoke (i.e., the smoke delivered to the smoker). Moreover, the combustion process will be altered with a relative increase in pyrolytic products, as a result of decreased combustion efficiency.

Consideration of two additional points is in order. The first relates to toxicity and the second to the issue of consumer acceptance. As to the first, it must be remembered that when new compounds are proposed for addition to the cigarette, either to the tobacco filler or to the cigarette paper, it is likely that some fraction of

the added material, its thermal decomposition products, or reactants of its thermal decomposition products and tobacco moieties will enter the smokestream and be inhaled by the smoker. The patent and scientific literature is replete with impractical suggestions as to materials to be used to develop a self-extinguishing cigarette. The relevant literature contains references to such materials as halogenated compounds, antimony trioxide, urea, diethanolamine, melamine, organophosphorous compounds, and the like, as materials for imparting flame resistance. The toxicity of some of these materials, particularly in regard to tumorigenicity, has been sufficiently demonstrated as to preclude their use in the cigarette, whereas toxicity is unknown for others.[10]. In addition, all of these and similar additives would decrease the efficiency of the burning process, thus increasing the production of pyrolytic products.

The second point that must be borne in mind in discussions of self-extinguishing cigarettes is that the smoker anticipates that the cigarette will burn with a uniform static burn rate. If the cigarette extinguishes during normal use, the consumer is likely to conclude that the product somehow is defective, particularly because relighting will produce a highly undesirable taste. Similarly, modifying the composition of the smoke by additives, changing the material balance between mainstream and sidestream smoke, increasing pyrolytic products, changing the distillation processes, and other like

modifications, will alter product taste perceptibly -- even if the smoker is able to keep the cigarette lighted. Moreover, a cigarette designed to self-extinguish when not being puffed will inevitably deliver more mainstream smoke to the smoker. Many proponents of the hypothesis that cigarette smoking is a causative factor in certain diseases believe that a higher yield of smoke per cigarette is undesirable. In fact, the Federal Trade Commission reports to the public on "tar" and nicotine yields per cigarette by brand appear to be premised on this belief and may have influenced consumers to prefer lower yield cigarettes.

The Relevant Patent Literature

A review of the United States and foreign patent literature with respect to "self-extinguishing", "fire hazard" reduction and "fireproof" cigarettes has yielded numerous patents. An additional search of the general literature provided only a few references to concepts designed to cause the cigarettes to go out when not being puffed. All of these concepts are also contained, however, in the patent literature.

1. Patents for cigarette papers that would reduce burn rate to the point at which the cigarette would go out if not being puffed.

Patents included: U. S. Patent 2,329,927 (cigarette paper treated with borax and salt)

U. S. Patent 4,230,131 (tobacco and paper treated with boric acid, benzene phosphonic acid and a reaction product of benzene phosphonic acid and melamine)

U. S. Patent 2,327,991 (cigarette paper incorporating glass fibers between the paper and tobacco)

U. S. Patents 1,905,416; 4,044,778; 4,146,040; and 4,187,862 (treatment of paper with alkali metal silicates)

Discussion: All of these patents would increase the amount of smoke delivered per cigarette to the smoker. They also would increase the relative contribution of pyrolytic products in the smoke stream. The smoke condensate collected from cigarettes covered by these patents would be predicted to have greater specific activity for tumorigenicity on mouse skin. The patent that would incorporate glass fibers between the cigarette paper and tobacco is of questionable use because of the potential toxicity of inhaled fragments of the glass fibers. The toxicity of silicates, borates, and phosphonic acids in the tobacco matrix is unknown; however, lack of toxicity is not assured. Silicates, borates and benzene phosphonic acid could act, for example, as catalytic agents modifying smoke composition at the temperatures prevailing on the surface of the burning cigarette.

2. Flame-proof cigarette paper networks and partial wrappers.

Patents included: French Patents 1,517,262; 1,537,845; 1,590,223; 2,044,336; and 2,177,138; and U. S. Patents 3,632,384 and 3,736,940 (cigarette paper with perforated flame-proof network)

Discussion: These patents describe processes for the manufacture of cigarette paper with a perforated flame-proof network that would reduce the fire hazard otherwise presented when lighted cigarettes are dropped or fire cones are lost. The network is described as one that will vitrify and consists of metal oxides, talc and adhesives or gums. These patents would attempt to reduce the possibility of accidental fire by insulating the cigarette -- rather than, as with the patents in Category 1 above, simply reducing the burn rate so that the cigarette would go out when not being puffed.

Clearly, the porosity of the paper manufactured with these patents would be impaired by the described network of inorganic material, and smoke yields from cigarettes using the paper would be increased. A closely spaced network would be required to have any chance of realizing the claims of these patents, which means that the porosity loss would be quite significant. As with the patents discussed immediately above, pyrolytic

products would be substantially increased with these patents and, depending upon the metal oxides that were used, new products of undetermined toxicity could be introduced into the tobacco smoke stream.

Additional patents: U. S. Patents 3,165,105; French Patent 1,040,981 (cigarette paper covered with spots of aluminum foil or perforated aluminum foil laminated to the cigarette paper)

British Patent 22,161 (asbestos paint on cigarette paper)

Discussion: These patents suffer from the same drawbacks as those discussed immediately above -- that is, the normal porosity of the paper would be severely reduced, smoke yields to the smoker would increase, pyrolytic products would be enhanced and the diffusion through the unburned cigarette of gases such as carbon monoxide would be decreased.

In addition, inclusion of asbestos in cigarettes (British Patent 22,161) is questionable in light of current scientific knowledge about asbestos.

3. Fire resistant bands or rings.

Patents included: Swiss Patent 142,429 (metal foil band)

German Patents 531,768 and 549,936; U. S. Patent 2,718,889 (band of aluminum or other metal foil)

U. S. Patent 3,102,543 (cellulosic tape band incorporating adhesive or metal foil)

U. S. Patent 2,049,320 (band consisting of silicate, starch or talc)

U. S. Patent 3,030,963 (water soluble silicate to impregnate the cigarette paper in spots or bands)

U. S. Patents 1,581,451; 2,335,432; 2,536,900; 2,965,107; 3,091,243; and 3,977,416; French Patents 1,553,960 and 1,560,360 (fixed or adjustable sleeve consisting of non-combustible material)

British Patent 1,214,319; U. S. Patent 1,798,537 (band of metal or other non-combustible material used in conjunction with strategically-located airspace)

Swiss Patent 240,987 (band of asbestos or metal)

U. S. Patent 1,555,320 (band of tobacco leaf)

U. S. Patent 2,666,437 (band of wax paraffin)

French Patent 1,446,152 (heat-shrinkable band, fixed or adjustable)

British Patent 421,236 (non-combustible band at butt-end of cigarette)

Discussion: These patents basically render a part of the cigarette unsmokable, depending upon where the

band or sleeve is located. They would cause the cigarette to go out, even when being actively puffed. In many cases, the cigarette then could not be relighted without the consumer cutting off, or removing in some other way, the band or sleeve. Use of these patents would correspond with a drastic shortening of the length of the tobacco column or a drastic lengthening of the tipping paper on a filter cigarette, obviously impractical solutions. But either of those alternatives would be more practical than attempting to fabricate a band and incorporating it into the cigarette.

In addition, some of these patents (e.g., Swiss Patent 240,987) could involve the use of a toxic substance. Those patents therefore also should be rejected on that basis.

Additional Patents: U. S. Patent 1,996,002 (band or bands consisting of inorganic salts such as ammonium sulfate, chloride, sulfate, phosphate or boric acid)

U. S. Patent 2,013,508 (band or bands consisting of a cellulose ester and inorganic salts attached to the cigarette with an agglutinating substance)

U. S. Patent 1,999,222 (bands of agglutinating substance)

U. S. Patent 3,702,117 (oil treated discs)

Discussion: These patents differ from those described immediately above in that they would cause the cigarette to go out only when not being puffed. They would not cause the cigarette to extinguish when being actively puffed.

These patents are subject to many of the same objections as the patents discussed in Category 1 above. If the bands employed were of sufficient number and width to cause the unattended cigarette to go out at predetermined intervals, the porosity of the paper would be decreased significantly -- and there would be a corresponding decrease in the efficiency of the burning process. Decreasing the efficiency of the burning process in the manner suggested by these patents would tend to increase smoke yields and the production of pyrolytic products, while impairing the diffusion of gases. There is also the possibility that the substances used to create the band would prove to be toxic, or would act as catalytic agents modifying smoke composition at the temperatures prevailing on the surface of the burning cigarette.

4. Additives to the tobacco filler to insulate, reduce burn rate and retain ash.

Patents included: British Patent 909,699 and U. S. Patent 3,034,932 (mixing substances such as aluminum trihydrate with tobacco)

U. S. Patent 2,307,088 (addition of a mixture of glass fibers and adhesive to tobacco)

U. S. Patent 3,183,914 (insoluble alkali metal silicate mixed with tobacco)

Discussion: These patents, like those discussed in Category 1 above, would reduce the burn rate of the cigarette -- presumably to the point at which the cigarette would go out when not being puffed. But like those other patents, they also would decrease the efficiency of the burning process, thereby increasing smoke yields and the production of pyrolytic products. Aluminum trihydrate (British Patent 909,699 and U. S. Patent 3,034,932) also may act as a catalyst for the introduction of toxic components into the tobacco smoke. In addition, some amount of the alumina would be inhaled by the smoker. This raises serious questions in view of the research associating chronic obstructive pulmonary disease with insoluble inorganic aluminum salts. The addition of glass fibers (U. S. Patent 2,307,088) and insoluble alkali metal silicates (U. S. Patent 3,183,914) would appear questionable because of the potential toxicity of these substances.

5. Fire-proof wrappers.

Patents included: U. S. Patent 2,754,828 (non-flammable sheet with many apertures in which cigarette is to be wrapped prior to smoking)

U. S. Patents 1,020,864; 1,666,062; 2,098,619; 2,890,704; and 2,998,012 (wrappers of fibrous glass, interwoven glass fibers, or other similar materials)

U. S. Patent 3,220,418 (combustible wrapper with sheath separated by sodium silicate)

Discussion: These patents would place a non-combustible wrapping around the cigarette or a barrier substance (sodium silicate) between a combustible wrapping and the cigarette. The wrappings and barrier substance suggested by these patents are intended to act as a shield between the lighted cigarette and any surface on which the cigarette might be laid or dropped.

The fundamental problem with all of these patents is that they would impede the flow of oxygen to the cigarette, thereby decreasing the efficiency of the burning process. As before, use of these patents therefore would impair the diffusion of gases out of the unburned tobacco column. Additional pyrolytic, and possibly catalytic, reactions also would occur, altering the composition of the tobacco smoke in a manner tending to increase toxicity in

mouse skin painting experiments and increasing smoke yields per cigarette.

Patents suggesting the use of glass fibers also may be unusable because of the potential toxicity of inhaled fragments of silica. Placing the cigarette inside a combustible wrapper, with a barrier of sodium silicate, also would present exceedingly difficult manufacturing problems. Finally, the remaining patent (U. S. Patent 2,754,828) does not describe the material that might be used for wrapping and therefore has no practical significance.

6. Anchors and other similar devices to prevent loss of the fire cone.

Patents included: U. S. Patent 3,081,776 (ceramic anchors embedded in the tobacco near the butt end of the cigarette)

British Patent 19,694 (wire embedded in and extending the length of the tobacco column); British Patent 805,693 (heat shrinkable vinyl plastic ring to prevent loss of fire cone at butt-end of filter cigarette)

Australian Patent 149,216 and Belgian Patent 659,839 (adhesive coating on inside of cigarette paper to retain burning tobacco coal)

Discussion: These patents address a situation, the loss of the fire cone near the butt end of the cigarette,

that has been solved in other ways by modern technology. Cigarettes now being manufactured in the United States contain increased amounts of tobacco near the butt end. This prevents loss of the fire cone near the butt end as water and other condensables collect in this section of the cigarette.

Moreover, it is extremely doubtful that loss of the fire cone, even were that to occur, would cause an accidental fire. There is little heat generating capacity in the fire cone of a cigarette. The most that could be expected to happen, in the event a fire cone were dropped, is that a hole would be burned in low melting materials or a slight char would develop on higher melting materials

7. Fire barriers: discs, spacers and implanted fire-extinguishing agents.

Patents included: German Patent 608,407 (insert at predetermined position in tobacco column a non-flammable porous material filled with permeable openings)

German Patent 1,959,684 and French Patent 1,402,088 (non-flammable, low heat conducting, gas permeable bed of aluminum phosphate or similar material)

U. S. Patent 3,288,145 (fire barrier of metal foil)

British Patent 835,923; U. S. Patents 1,726,737; 2,547,119 and 3,985,143 (heat rupturable capsule, sack or disc containing water or other liquid)

U. S. Patent 1,605,059 (asbestos disc in conjunction with a section of cigarette paper coated with paraffin)

U. S. Patent 2,246,929 (pellet plus outer shell of tinfoil and core of fire-resisting material)

U. S. Patent 1,821,159 (wire disc containing fire extinguishing substance)

U. S. Patent 3,528,432 (tobacco impregnated with polyamide of an oxyacid of phosphorous rendering the treated tobacco non-combustible)

U. S. Patent 3,276,453 (fire barrier of rice hull ash in the form of a gas permeable disc)

U. S. Patent 2,786,471 (expanded vermiculite to form a permeable fire barrier)

U. S. Patent 4,091,821 (disc of paper, metal, ceramic or plastic with small hole in center)

Swiss Patent 348,094 (metallic disc with a hole pattern)

British Patent 1,113,941 (additive to tobacco to render tobacco non-combustible)

Discussion: These patents are subject to many of the same objections as those described in connection with the patents in Category 3 above (fire resistant bands or rings). Essentially, they would render unsmokable that portion of the cigarette located behind the fire barrier. If the barrier were located near the butt end of the

cigarette, it simply would duplicate the effect of the tipping paper on filter cigarettes (which comprise more than 90 percent of the market in the United States). Locating the barrier farther down the tobacco column would be no more effective than drastically shortening the length of the cigarette or drastically lengthening the tipping paper. In addition, certain of the patents in this category (e.g., U. S. Patent 3,288,145) would add a toxic substance to the cigarette. Many of the remaining patents would utilize substances that might act as catalytic agents, modifying in an unacceptable manner the composition of the mainstream smoke.

8. Encapsulated cigarettes or secondary fire-proof holders.

Patents included: U. S. Patents 1,517,142; 1,744,615; 1,770,616; 2,526,572; 2,607,353; 2,625,163; 2,679,251; 2,701,571; 2,827,059; 2,932,301; 3,821,958; 3,886,954; 3,916,916; 4,027,680; and British Patents 340,884 (metal, plastic or other non-flammable holders to encase the cigarette)

Discussion: All of these patents describe holders that might be used to encase the cigarette, presumably so that no part of the cigarette would come into contact with any surface on which it might be dropped or laid. Although all of these patents provide for holes or channels to permit some oxygen to reach the cigarette, they would significantly

impede the flow of oxygen, thereby impairing the efficiency of the burning process, and cause an increase in smoke yield and pyrolysis. The smoke condensate collected from cigarettes burned in the holders covered by these patents would be predicted to have greater specific activity for tumorigenicity on mouse skin.

Additional patents: U. S. Patents 1,211,071; 2,900,987; and 4,121,597 (holders in conjunction with flame extinguishing band)

U. S. Patent 2,134,213 (holder consisting of oil-treated, moisture-proof paper); U. S. Patent 4,034,767 (spring-loaded holder to encase the cigarette); U. S. Patent 101,312 (tubular holder with snuffer); U. S. Patent 2,788,005 (holder with ash collecting device)

Discussion: The primary feature distinguishing many of the patents in this section from others is that the holder would be separate from the cigarette itself, so that it would have to be put in position or manipulated by the smoker. These patents suffer from all of the problems associated with fixed holders. In addition, it is doubtful whether smokers could be relied upon to use such devices even if toxicity were not a factor.

* * * * *

Summary: While the patent literature contains numerous concepts, devices and substances that might be employed to cause cigarettes to "self-extinguish," there are

fundamental objections to each. The patents that are designed to slow the burn rate of the cigarette to a point at which it would go out if not being puffed would operate by decreasing the efficiency of the burning process, leading to increased smoke yields, the production of pyrolytic products, impaired diffusion of gases through the unburned cigarette, and possibly causing undesired catalytic reactions. Other patents, such as those that would utilize implanted discs, sacks and spacers, would render unsmokable substantial portions of the cigarette - obviously an impractical solution. In addition, many of the patents call for the use of toxic substances, and are of doubtful use for that reason. Generally, cigarette manufacturers have improved combustion efficiency over time, and today's cigarettes produce less "tar" and relatively less pyrolytic products than those of yesteryear. Many of the people who suggest that smoking is causative with respect to chronic disease would consider it counterproductive if the trend toward more efficient combustion were reversed.[11]

Thermodynamics

In order to better understand the properties of a cigarette as they relate to fabric ignition, a review of the relevant thermodynamic quantities is appropriate. It will be remembered by students of thermodynamics that the total internal energy of a process is represented by the term "enthalpy" and that the derivative of enthalpy with respect to time is represented by dH/dt, where "H" is enthalpy and "t" is time. At equilibrium, this derivative equals zero (dH/dt=0).

In the case of the smouldering cigarette, enthalpy with respect to time is composed of a term for heat generation, a term for radiation loss, a term for evaporation of water, a term for endothermic heats of reaction, a term for the energy required to heat ambient gases to the burning cone temperature, and a term for the energy required to propagate combustion.

Thus,

$$(3)\quad \frac{dH}{dt} = \frac{H_c W_T}{t_b} - ES60\sigma T^4 - \frac{W_T}{t_b} m\Delta H_{ev} - \frac{W_T}{t_b} \Delta H_{endo} - \frac{W_g}{t_b} C_g \Delta T_1 - \frac{W_m}{t_b} C_T \Delta T_2 = 0$$

where

H_c = heat of combustion of tobacco (cal/g)

W_T = weight of tobacco (g)

t_b = free or static cigarette burning time (min.)

E = emittance of cigarette coal = 1.0

S = cone surface area (cm^2)

σ = black body radiation constant = 1.37×10^{-12} cal/sec cm^2 deg^4

T = cone temperature (^oK)

m = tobacco moisture content (%)

ΔH_{ev} = heat of evaporation of water (cal/g)

ΔH_{endo} = endothermic heats of reaction (cal/g)

W_g = weight of gas (g)

C_g = specific heat of gas (cal/g/^oK)

ΔT_1 = temperature difference between ambient and cone (^oK)

W_m = weight of tobacco matrix (g)

C_T = specific heat of tobacco (cal/g/^oK)

ΔT_2 = temperature elevation required to ignite tobacco (^oK)

Restating equation 3, the amount of heat radiated with respect to time is

$$(4) \quad \frac{dH_R}{dt} = ES60\sigma T^4 = \frac{H_c W_t}{t_b} - \frac{W_t m \Delta H_{ev}}{t_b} - \frac{W_t \Delta H_{endo}}{t_b} - \frac{W_g C_g \Delta T_1}{t_b} - \frac{W_m C_t \Delta T_2}{t_b}$$

Integrating over the total burning time of the cigarette t_b,

$$(5) \quad H_R = ES60\sigma T^4 t_b = H_c W_t - W_t m \Delta H_{ev} - W_t \Delta H_{endo} - W_g C_g \Delta T_1 - W_m C_t \Delta T_2$$

Since $t_b = A\rho\ell$ for a given cigarette paper, strand width, tobacco type and since $W_t = \rho A\ell$

where A is cross section area (cm^2)

ρ is tobacco density (g/cc)

ℓ is length of tobacco column (cm)

$$(6)\quad H_R = ES60\sigma T^4 A = H_c\rho A\ell - \rho A\ell m\Delta H_{ev} - \rho A\ell\Delta H_{endo} - K'\rho A\ell C_g\Delta T_1 - K''\rho A\ell C_t\Delta T_2$$

and the derivative with respect to length is:

$$(7)\quad \frac{dH_R}{d\ell} = \rho A[H_c - m\Delta H_{ev} - \Delta H_{endo} - K'C_g\Delta T_1 - K''C_t\Delta T_2]$$

Thus, we may consider the heat radiated from a burning cigarette per unit time (equation 4) or per unit length (equation 7).

Considering the latter case first, it seems logical that the heat radiated per unit length is an indirect measure of the amount of heat radiating a unit of fabric surface when the cigarette is ignited and in contact with a fabric.

It may be noted from equation 7 that the heat per unit length of the cigarette is dependent on the tobacco density (ρ), cross-sectional area (A), the heat of combustion (H_c), and the moisture content (m) of the tobacco. In the case of equation 4, the weight of tobacco burned per unit time (W_t/t_b) and the moisture content (m) of the tobacco are important variables that determine the heat radiated per unit time. Since the heat of radiation (dH_R/dt) is a function of the tobacco burned per unit time, and this

is equal to mass static burn rate, this rate is important in satisfying the thermodynamics of equation 4. If the mass static burn rate becomes too small, the cigarette will extinguish, i.e. insufficient heat is produced to propagate combustion.

Consideration of "Cigarette Propensity to Ignite"

If one were to imagine a continuum of ignitable substrates which only differ in the temperature that must be reached for ignition to occur, deductive reasoning would suggest that a stationary source of fixed energy output per unit time could be used to ignite those substrates where the heat flux of the source is sufficient to bring the substrate surface to the required temperature for ignition. Those substrates whose ignition temperature could not be reached with the source would not ignite. If we now consider the source as having a variable output of energy per unit time, we could experimentally determine the heat flux or caloric output per unit time required to reach the ignition temperature of each substrate. Analogously, if we had numerous energy sources of differing heat flux, we could classify them by the ability or the propensity to ignite substrates to a certain point in the continuum.

The smouldering cigarette in contact with the surface of a substrate cannot be so simply represented. First, the cigarette when in contact with the substrate results

in an oxygen deficient environment at the site of contact, perhaps retarding ignition, and, secondly, the smouldering cigarette is moving over the substrate with time. Therefore, an important parameter would be energy radiated per unit length as long as the cigarette continues to burn.

Considering the actual substrates represented by upholstered furniture, the situation becomes more complex. Literally thousands of substrate combinations exist in the marketplace and in the homes of consumers. Whether or not the substrate is ignitable on contact with a cigarette is largely a function of the combination of materials used. It is clear, however, that the cellulosic materials are generally more prone to ignition than the thermoplastics and foams. Specifically, heavy cellulosics over cotton batting represent the most ignitable substrate, and heavy thermoplastics over polyurethane foams, the least ignitable.[12,18] Considering the light and medium weight cellulosics over foam, it is found that the amount of combustible substrate fuel per unit area becomes important in establishing a critical mass of char that results in sustained ignition.[13] The density and thickness of the ignitable cellulosic is also important in the thermal conductivity of the substrate and heat dissipation. Porosity of the char[28,29] is important in determining its reactivity with oxygen, and in the case of the cellulosics, the presence of alkali and certain transition metal cations has also been associated with ease of sustained smouldering.[14]

Given the large array of substrates used in the construction of upholstered furniture, it becomes clear that any attempt to classify cigarettes with regard to their propensity to generally cause an ignition has very little meaning. For example, it has been shown that an array of experimental cigarettes representative of commercial products do not cause ignitions on a substrate typical of the UFAC approved construction.[30] Conversely, there is no doubt that all commercial cigarettes can cause ignitions on many heavy cellulosic substrates. Since these extremes, but not rare situations, exist in the propensity of substrates to be ignited by cigarettes, attempts to classify cigarettes are not interpretable, unless the relationship on ignition propensity among all commercial substrates and those few used to classify the cigarettes is known. If the test substrates used to classify the cigarettes do not represent a significant range of ignition propensity in the marketplace, the cigarette ranking would have little importance to the fire scenario.

Krasny et al[15] have reported differences among commercial cigarettes on a selection of substrates. It is understood[16] that Krasny tested 70 different commercial substrates before he found a set of five that would allow a demonstration of differences in "ignition propensity" of several commercial cigarettes. This data and that produced by the United States Testing Company, Inc.[17] fall into the same category, namely by careful selection of a substrate and/or test protocol, differences in the burn rate and radiated heat per unit

length of selected commercial cigarettes can be amplified relative to the significance of these differences in the "ignition propensity" over the full range of upholstered furniture and mattress commercial substrates.

In the test procedure reported by Krasny, the cigarettes were placed on a horizontal panel of the substrate and cigarettes burned up to their entire lengths if ignitions were not obtained after lesser burning times. The results of such a test are a function of the heat per unit length of a cigarette, and as has been pointed out in the thermodynamics section, this is a function of the mass burned per unit length. It, therefore, is not surprising that Krasny found some correlation between this test and a measure of total weight loss from the cigarette on a chromatography paper substrate. Here, the measurement is almost directly equal to the mass of material burned per unit length. In both tests that Krasny has reported, the cigarette has only one point of contact with the surface, and oxygen diffusion to the cigarette is not sufficiently limited to consistently cause any of the cigarettes to extinguish even though they had significantly different burn rates in air.

The modified UFAC classification test conducted by The United States Testing Company, Inc. represents a very different situation.[17] Two panels of the substrate, consisting of fabric over polyurethane foam, were placed at right angles to each other, and different cigarettes were placed in the

crevice formed at the abutment of the panels. The cigarette was covered by cotton sheeting. This test is more severe from the aspect of the heat-radiated per unit length of substrate, since twice as much contact surface exists between the cigarette and the substrate, and the hot gases arising from the cigarette heat the vertical panel. The cover of cotton sheeting also reduces convective heat losses. The cigarettes which did not cause ignition were frequently those that extinguished before burning their entire lengths. Clearly, air diffusion is more restricted in this test, and the greater contact with the substrate increases the rate of heat loss from the cigarette.[34] Low ignition rates are correlated with low burn rates in air.

Although a third test has not been reported, it seems that a test where a cigarette is leaning against the vertical panel with the burning end down onto the horizontal panel would be appropriate. This would be a severe test with all commercial cigarettes projected to have the same ranking. This projection arises since all commercial cigarettes of any sales significance burn without extinction in air.

None of these tests consider other elements of the upholstered furniture construction that can give rise to ignition such as the welt cord and decking. Conventionally, the material used in the construction of welt cord and decking has been cellulosic in nature.

In order to obtain a further appreciation of the wide

range of substrates that are used in the marketplace relative to smoulder-resistance, it is appropriate to review a method which has been described by the National Bureau of Standards.[12] A fabric's tendency toward smouldering combustion is measured by placing the fabric over a relatively inert substrate of glass fiberboard. A lighted cigarette is then placed on the assembly. The extent of the char, in any direction, is used to classify the fabric. Class A fabrics char less than 3.8 cm over the glass fiberboard and less than 3.8 cm over untreated cotton batting. Typical materials in this class are heavy weight thermoplastics, nylon, polyvinyl chlorides, polypropylene, and wool. Class B fabrics consist of medium weight thermoplastics typified by nylon, certain polyolefins, rayon, nylon blends, and polyester blends. These materials produce chars of less than 3.8 cm over glass fiberboard, but produce chars of 3.8 cm or more over untreated cotton batting. Fabrics that produce chars between 3.8 and 7.5 cm over glass fiberboard are Class C and consist of medium weight cellulosics typified by rayon, cotton, and acetate fibers. Class D fabrics produce chars in excess of 7.5 cm over glass fiberboard and consist of the heavy-weight cellulosics typified by cotton. Generally there is a correspondence between this method of fabric classification and that which has been reported by UFAC. The UFAC method[31] involves the construction of two panels of fabric over polyurethane foam. The panels are arranged so that one

is horizontal and the other vertical, and the burning cigarette is placed in the crevice at the abutment of the panels and is covered with cotton sheeting. If no ignition occurs and the vertical char is no more than 3.8 cm on any of three separate tests, the fabric is classified as 1, otherwise the class is 2. Baitinger and Haynes[13] have studied the relationship of cotton fabric weights to the classification under UFAC and have found that most cotton fabrics which have a weight of less than 10 oz. per square yard are Class 1, and those over 10 oz. per square yard are Class 2. Comparatively, Loftus of NBS[12] has reported that the Class D fabrics are heavy-weight cellulosics generally greater than 15 oz. per square yard and that Class C fabrics are cellulosics in the range of 9 to 15 oz. per square yard. Thus, it appears that Class 2 under UFAC approximately corresponds to Class C and D fabrics under NBS.

In 1976, it was estimated that about 63% of the upholstered furniture used cellulosic fabrics,[18] and in 1978 an estimate was made that 50% of the better furniture employed cellulosic fabrics.[19] Richmond[20] indicated that the compositional usage of upholstered furniture filling material in 1982 was as follows: cotton batting, 19%; polyurethane, 35%; polyester, 25%; cotton/polyester blend, 22%. Richmond also estimated that 84% of the dollar volume of the upholstered furniture produced in 1982 was of UFAC approved construction (i.e. expected to pass cigarette ignition tests). However, subsequent tests on the furniture by the

Consumer Product Safety Commission indicated that only about 40% of the UFAC approved construction furniture passed a cigarette ignition test.[21] This is an example of the difficulty in applying and interpreting cigarette ignition tests. Here tests conducted by different laboratories gave incongruous results.

It is clear that the upholstered furniture has been manufactured in the past and is currently being manufactured with a high percentage of cellulosic materials. Presently, the percentage of cellulosic fabrics appears to be in the range of 50%, and certainly before the advent of synthetic fibers and polyurethane foam, the percentage of cellulosic materials was higher. It is also clear from the fabric classification tests that untreated cellulosic materials are those that are subject to cigarette ignition. It follows that if an impact is to be made on the fire scenario by modification of a cigarette, it must be modified so that it no longer is a potential ignition source for cellulosic substrates whether they be used in the filling, the fabric, the welt cords, or the decking, since cellulosics have been and continue to be a major element in the construction of upholstered furniture.

Feasibility of Modifying Cigarettes So That They Will Not Ignite Cellulosic Materials

Consider a cotton fabric with a heat capacity of 0.37 cal/gram^{o}C and a weight of 20 oz./yd^2 or 70 mg/cm^2 and an ignition temperature of about 350^{o}C.[22,33] It is calculated that only about 10.5 cal/cm^2 of fabric is required to heat it to the ignition temperature. This estimate allows about two calories for heat of evaporation and endothermic reactions. This same material would transmit heat by conduction at a rate of 0.9 cal/min. based on a thermal conductivity of 0.136 x 10^{-3} g-cal/sec (cm^2) (deg c/cm), and little heat will be lost by radiation from this substrate of heavy cotton fabric over the time frame of heating by the cigarette. Similarly, little heat will be lost by convection until the cotton substrate degrades, the fibrous network is destroyed, and air permeability is increased during the latter stages of heating. It is estimated that the heat transfer process from a cigarette in contact with a cotton substrate is efficient and that a total of 11-12 cal/cm^2 is needed to heat the cotton to the ignition temperature.

Wu and Norman[23] have reported data on radiated heat from a number of commercial cigarettes, filtered and non-filtered, during smouldering combustion in air. The average heat of radiation was equal to 1070 cal/g of tobacco, and no significant differences were found among the cigarettes. Similar measurements on a number of

experimental cigarettes over a wide range of tobacco density and circumference gave similar results. Using the value of 1070 cal/g, the value for $dH_R/d\ell$ of equation 7 on page 27 has been calculated as follows.

Table 1

Sample	Circumference	Cross Sectional Area	Tobacco Density	$dH_R/d\ell$
1	24.8 mm	.489 cm^2	.272 g/cc	142 cal/cm
2	24.8	.489	.241	126
3	24.8	.489	.203	105
4	24.8	.489	.147	77
5	23.0	.421	.261	118
6	23.0	.421	.238	107
7	23.0	.421	.232	104
8	23.0	.421	.164	74
9	21.8	.378	.280	113
10	21.8	.378	.249	101
11	21.8	.378	.211	85
12	21.8	.378	.153	62

Thus, experimentally the heat of radiation per unit length can be varied by a factor of two, however, the actual percentage of this heat that is available to heat the fabric surface cannot be calculated. It can be observed that when a 24.8 mm circumference cigarette is placed on a cotton fabric and no ignition occurs, the cotton is thermally degraded over a 1 cm wide band the length of

the burning cigarette.[24] Therefore, a square centimeter of fabric is heated to decomposition for every centimeter of cigarette length. The total heat radiated from a centimeter length of a 24.8 mm circumference cigarette (142-77 calories in the prior table) is many times the requirement to raise the material to ignition temperature (previously estimated at 11-12 calories). Since the low energy cigarette produced ignition on 20 oz./yd^2 homespun fabric over polyurethane when placed on the flat open surface, it may be concluded that a greater fraction of the total radiated heat than 11-12/77 or 15% is absorbed by the cotton surface. Although an experimental cigarette could not be constructed to confirm the following estimate, it appears from the angle produced by intersecting lines from the center of the cigarette to the edges of the char line on the fabric that about 25% of $dH_R/d\ell$ is radiating to the fabric. To avoid ignitions, this would require cigarette densities of less than 0.1 g/cc. This is an experimental impossibility.

The lowest experimental cigarette densities of Table 1 are beyond the current range of commercial cigarettes, and, in fact, are beyond the current range of commercial feasibility. Since the lowest density cigarettes have sufficient radiated energy to ignite many upholstered furniture substrates and are outside the feasibility range, it may be concluded that the reduction of $dH_R/d\ell$ does not offer a solution to the cigarette ignition of many untreated cellulosic substrates.

Table 2 illustrates the fact that paper additives and paper porosity in the commercial range have no effect on $dH_R/d\ell$ but that circumference is related. However, as the circumference changes, the area of substrate radiated decreases by the same amount and the heat flux per unit area of fabric remains the same.

Table 2

Sample	Circum-ference	Paper Porosity	Paper Additive	dH_R/dt	$dH_R/d\ell$	Density
13	24.8 mm	25 cu	None	46 cal	147 cal	.279 g/cc
14	24.8	25	.6% phosphate	48	154	.294
15	24.8	25	.6% citrate	50	150	.286
16	24.8	25	None	43	70	.134
17	24.8	25	.6% phosphate	46	70	.134
18	24.8	25	.6% citrate	50	70	.133
19	24.8	18	.6% citrate	49	142	.272
20	21.8	18	.6% citrate	42	113	.280

The only other technically feasible approach to a cigarette that would not ignite many untreated cellulosic substrates is that which results in a cigarette that extinguishes itself very quickly when in contact with the substrate. Although the impracticality of this approach has been discussed at an earlier point in this paper, it perhaps is worth a little more discussion, particularly with respect to the experimental cigarettes of Table 2 and the thermodynamics of equation 4 on page 26.

Although it is difficult to find the exact point or value of dH_R/dt at which insufficient heat is being produced to sustain combustion, observation and mass burn rate measurements place the value in the range of 25-30 cal/min.[24] A cigarette will self-extinguish when dropped onto a surface if its burn rate is near this threshold, since oxygen flux is occluded when the cigarette is in contact with the surface and heat losses from the burning cone are increased. Table 2 shows that tobacco density has no effect on dH_R/dt and that paper additives within the range that they are normally employed have little effect on this parameter. Circumference and porosity do affect dH_R/dt. In order to reduce dH_R/dt to the range of 25-30 cal/min., small circumferences and very low porosity papers must be contemplated. It is estimated that the paper porosity required for a 20 mm circumference cigarette is two or three CORESTA units, much less than the porosity of paper used on commercial cigarettes.

While it has not been established that such data has significance to the human smoking experience, data publisned by the National Cancer Institute[25,26] indicates that cigarettes made with low porosity paper (7 CORESTA units) produced a mainstream smoke condensate which was more

tumorigenic on mouse skin than that produced from cigarettes with paper porosities greater than 25 CORESTA units. Analytical data on these same condensates indicated that the concentration of pyrolysis products per gram of condensate was higher from mainstream smoke condensates produced from the low porosity paper cigarettes. It may also be estimated that the increase in "tar" resulting from the use of such low porosity paper compared to the present commercial porosities would be about 40%. Clearly, the use of paper which is sufficiently non-porous to reduce the dH_R/dt to the point where a cigarette would extinguish shortly after contact with a cellulosic substrate is beyond the range where efficient combustion of tobacco occurs. This is not a desirable direction.[27]

Conclusions

It is concluded that cigarettes smolder at 700°C and that this temperature is essentially not modifiable. Cotton and other cellulosic substrates ignite at around 350°C. Heat flows from the cigarette to the substrate with a flux that is far in excess of that required to heat untreated cellulosic substrates to the ignition temperature. In order to produce a cigarette that extinguishes when in contact with such a substrate, it must be rendered unusable by the smoker. The

reductions in cigarette burn rates or reductions in the heat output per unit length within the practical range will not have an impact on the fire scenario. Attempts to rank cigarettes by differences in propensity to ignite a particular substrate or several substrates cannot be interpreted with respect to the fire scenario unless an understanding of the relative importance of the substrates used in ranking to those in the marketplace and homes is known. The statement made in the introduction of this paper that legislation with respect to the thermodynamic properties of the cigarette will not stimulate a solution to the fire scenario is accurate.

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SPEARS, Alexander White, III: Executive Vice President, Operations and Research; Lorillard, A Division of Loews Theatres, Inc.; 2525 East Market Street, Greensboro, N. C. 27420

Place of Birth: Grindstone, Pennsylvania (September 29, 1932)

Education: B.S. Allegheny College, 1953;
Ph.D. State University of N.Y. at Buffalo, 1960

Experience: Research Associate, State University of N.Y. at Buffalo, 1956-1958.

Research Fellow, ibid 1958-1959

Instructor, Millard Fillmore College, 1958-59

Research Associate, P. Lorillard Company, 1959-61.

Assistant Professor, Greensboro Division, Guilford College, 1961-65.

Senior Research Chemist, Greensboro Division, P. Lorillard Company, 1961-65.

Director, Basic Research, P. Lorillard Company, 1965-68.

Director, Research and Development, Lorillard, A Division of Loews Theatres, Inc., 1968-71.

Vice President, Research and Development, Lorillard, A Division of Loews Theatres, Inc. 1971-75.

Senior Vice President, Operations and Research, Lorillard, A Division of Loews Theatres, Inc. 1975-79

Executive Vice President, Operations and Research, Lorillard, A Division of Loews Theatres, Inc. 1979 to present

Professional Memberships: (Past and Present)

American Chemical Society; Society for Applied Spectroscopy; Plant Phenolic Group of North America; Coblentz Society; American Management Association, New York Academy of Science; Sigma Xi; ASTM; Scientific Commission of CORESTA (International Cooperative Center for Scientific Research Relative to Tobacco), 1972-76; Who's Who in America; Who's Who in the South and Southwest; Who's Who in the East; Who's Who in the World; Leaders of American Science.

Dr. Alexander White Spears, III (Cont'd) -46-

Service Record: U. S. Army, 1953-55.

Areas of Research: Pyrolytic Reactions and Products; Spectroscopy; Chromatography; Analytical Methods: Structure of Nature Products; Tobacco; Foods.

Contributions: U. S. Patent Literature

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Development of A Candidate Test Method for the Measurement of the Propensity of Cigarettes to Cause Smoldering Ignition of Upholstered Furniture and Mattresses

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Development of a Candidate Test Method for the Measurement of the Propensity of Cigarettes to Cause Smoldering Ignition of Upholstered Furniture and Mattresses

by

J.F. Krasny*, P.J. Allen**, A. Maldonado Rosado***
and N. Juarez Martinez***

ABSTRACT

A candidate test method for the measurement of the propensity of cigarettes to cause smoldering ignition of upholstered furniture and mattresses was developed. It consists of placing burning cigarettes on pieces of a standard, alpha cellulose, chromatographic paper and measuring the weight loss rate of the paper/cigarette system. The results were compared to the propensity of cigarettes to ignite upholstered furniture substrates. The agreement was satisfactory. Of the approximately 30 cigarette brands investigated, most had a similar propensity to ignite the upholstered furniture substrates, but a few ignited fewer substrates, and exhibited longer

*Center for Fire Research, National Bureau of Standards, Washington, D.C.
**Participant in the Cooperative Study Program, NBS-University of Maryland.
***Participants in the Cooperative Study Program, NBS-University of Puerto Rico.

times to ignition on those which ignited. Many upholstered furniture substrates resisted ignition by any cigarette, while others were ignited even by those commercial cigarettes which ranked lowest in ignition propensity in these tests. However, a substantial number of upholstered furniture types did ignite with some cigarettes but not with others. Self-extinguishing time alone does not define the propensity of a cigarette to ignite upholstered furniture.

Keywords: cigarettes; flammability; ignition; self-extinguishment; smoldering; test development; upholstered furniture.

1. INTRODUCTION

The National Bureau of Standards' Center for Fire Research has maintained a long-standing program on the ignition and burning of mattresses and upholstered furniture. According to estimates by the U.S. Fire Administration, burning cigarettes and other smoking materials inadvertently dropped on upholstered furniture caused 29,000 residential fires in 1977 [1][1]. These fires led to 1170 deaths, 3000 injuries, and $150 million property damage. Upholstered furniture fires were the leading cause of deaths in residential fires, and dropped cigarettes caused about 75 percent of them. Another report states that cigarettes dropped on upholstered furniture and bedding caused 27 percent of U.S. fire deaths [2]. A more detailed breakdown of the data is given in a recent report by the Consumer Product Safety Commission (CPSC) [3].

[1]Numbers in brackets refer to the references at the end of this report.

Numerous voluntary and mandatory routes have been taken in the U.S. and abroad to reduce this toll. For example, mattresses sold in the U.S. are covered by a Federal standard designed to make them more resistant to cigarette ignition [4]. A substantial part of the furniture sold in the U.S. is now covered by a voluntary labeling program initiated by the Upholstered Furniture Action Council (UFAC) [5,6]. However, reported restrictions on choice of upholstery materials, and the delay in seeing the effects of such efforts because of the 15 to 20 years service life of upholstered furniture and mattresses, have prompted alternative approaches to be suggested as well. The most widely discussed of the alternatives is the "self-extinguishing cigarette" [7].

The pros and cons of self-extinguishing cigarettes have been widely discussed. However, the technical content of that discussion has, to date, been sparse. Of particular importance are two issues: 1) whether the manufacture of such cigarettes is technically feasible and commercially desirable and 2) whether, and to what extent, the burning properties of a cigarette translate into the reduced likelihood of furniture ignition.

NBS has no expertise in the technology of cigarette manufacture, so it cannot contribute to the debate on the former. However, we can contribute technical information in the latter area.

This report reviews the state of the art of increasing the cigarette ignition resistance of upholstered furniture and mattresses. This is followed by a progress report on laboratory work leading to the ranking of

the propensity of different cigarettes to ignite upholstered furniture substrates, and the efforts to develop a test which would predict this propensity. A draft of such a test method is appended. No attempt was made to evaluate systematically the performance of commercial or experimental cigarettes.

1.1 Current Cigarette Ignitability Tests for Mattresses and Upholstered Furniture

Current tests for the ignitability of mattresses and upholstered furniture employ one of two technical approaches. In one, the actual product (or a mock-up in which the fabric, filling material, etc. are arranged in the same manner as in the production item) is tested by placing one or more specified cigarettes in specific locations on the item. Among the measures following this approach are the U.S. [4], Canadian [8] and French [9] mattress standards, the Draft Proposed Standard for the Flammability (Cigarette Ignition Resistance) of Upholstered Furniture prepared by NBS for the U.S. Consumer Product Safety Commission (CPSC) [10], the voluntary upholstered furniture standard of the Business and Institutional Furniture Association which is based on the CPSC draft standard [11], the British upholstered furniture standard [12], and the essentially identical International Standards Organization (ISO) draft standard. Criteria such as "continuing combustion" and char length are used in these standards.

Another approach is to test single components of the furniture, e.g., the fabric, filling material, welt cord, etc. separately. This approach does not consider interaction effects between the materials, but is

somewhat simpler and cheaper. This approach has been adopted by UFAC [5] and the California Bureau of Home Furnishings [13]. For example, in the classification of filling materials like foam, a standard fabric covers the specimen to be tested. A lighted cigarette is then placed into the crevice formed by a horizontal and a vertical fabric/foam surface. UFAC specifies a maximum char length as the pass-fail criterion, while California uses a maximum allowed weight loss.

1.2 Cigarette-Upholstered Furniture Interaction

A considerable amount of information on the cigarette ignitability of a wide variety of upholstered furniture constructions can be found in the literature [5, 14-26]. Some of this information is summarized in Table 1, where fabric types, filling and welt cord materials, and furniture configuration features are listed in order from least to most cigarette ignition prone. Materials listed next to each other in the table may overlap in their ignitability. Cellulosic fabrics of a given weight may vary because of differences in construction, present of back-coatings which tend to reduce ignitability, or the presence of alkali metal ions (sodium, potassium) which increase smoldering tendency and are found on natural cotton or as a deposit originating with the dyeing or finishing processes [27].

Similarly, the various construction parameters of foam, such as choice of chemicals, density, cell structure, etc. can affect cigarette ignitability. Some foams are made smolder-resistant (SR) by addition of certain chemicals. Flame retardants (FR) which improve the resistance of foam and fabrics to ignition by flames do not necessarily increase the smolder resistance, and in the case of some early formulations, decrease it [14].

TABLE 1. Furniture Construction Parameters Listed in Approximate Order of Increasing Cigarette Ignitability

	Cover Fabrics*	Filling/Padding	Welt Cord	Construction Parameters
Least Ignitable	Thermoplastic: (nylon, olefin, polyester)	Heat dissipating materials, e.g., aluminized fabrics	PVC	Flat areas
	heavy ↓ light	Neoprene type foam layers	Thermoplastics	Crevices at junction of cushion and back and
		Polyester batting	SR** treated cellulosic (cotton paper)	crevices with 90° angle
		Urethane foam		crevices with acute angles
	Cellulosic: (cotton, rayon, hemp, linen)	SR** cotton batting	Untreated cellulosics	
Most Ignitable	light ↓ heavy	Untreated cotton batting		

*Backcoating decreases ignitability

**Smolder resistant

In order to pass any one of the above mentioned cigarette ignition tests, it is not necessary to use only the materials listed near the top of Table 1. In many cases a combination of medium weight thermoplastic fabrics with polyurethane foam, or a low to medium weight cellulosic fabric over foam covered with polyester batting will pass. In some cases combinations may pass when ignition is attempted in the flat area of the cushion but not the crevice.

The other obvious approach to the problem of cigarette ignition of upholstered furniture is to change the cigarette by reducing its propensity to cause smoldering ignition (which may or may not lead to flaming ignition). Legislation to this effect is currently before Congress [7]. The original versions of these bills require self-extinguishment of cigarettes within five minutes if not smoked. This choice of time was probably based on a report which stated that "95 percent of furniture ignitions occurred within ten minutes or more after exposure of the material to the lit cigarette" [28]. These results were obtained in a laboratory situation by estimating the time of ignition of the furniture fabric and filling material while cigarettes were smoldering on them. Such visual estimates are unreliable because the cigarette and its ashes obscure the smoldering zone. As is described in detail below, our experience shows that better results can be obtained when burning cigarettes are placed on upholstered furniture substrates and removed after 1,2,3...minutes, and continued smoldering or self-extinguishment of the substrate is observed for at least 10 minutes. By this method, cigarette ignitions of substrates were found to occur after as short as 1 to 2 minute exposures.

In addition, the term "self-extinguish" is not easily defined. Whether a cigarette self-extinguishes or not depends on the nature of the substrate which it contacts. That is, some cigarettes self-extinguish in air but may cause smoldering ignition of heavy cellulosic fabrics over cotton batting or foam. Self-extinguishment of the cigarette itself has been observed to occur for certain cigarettes on some fabric/foam substrates while the substrates continued to smolder.

Current versions of the two bills [7] contain a provision which would give the Consumer Product Safety Commission (the agency identified to administer the law if passed) considerable latitude to define an acceptable level of the propensity of cigarettes to cause smoldering ignition of furniture. Specifically, the bills provide for use of laboratory screening tests "to insure that cigarettes or little cigars do have minimum capacity for igniting smoldering upholstered furniture and mattress fires". Although begun before and independently from the proposed legislation, the work in this report provides a means of determining the likelihood of ignition by different cigarettes.

To our knowledge, there has been no previous effort to develop a test for the propensity of various cigarettes to ignite upholstered furniture or mattresses. Testing of the propensity of cigarettes to ignite wildland material, such as grass and forest cover, has been reported in the literature [29-31]. Several authors have described efforts to ignite various textile materials with cigarettes [32,33]. Apparel fabrics could not be ignited by cigarettes, but as discussed earlier, smoldering ignition of upholstered furniture and mattresses was found to be a common occurrence. Such smoldering may lead to flaming ignition, after periods of minutes or hours.

2. TEST DEVELOPMENT

2.1 Ranking of Cigarettes

2.1.1 Approach

During the initial stages of the development of a test for the propensity of cigarettes to cause smoldering ignition of various upholstered substrates, the following decisions were made:

(1) The general approach would be as follows: first, identify fabric/filling material substrates with graduated cigarette ignitability; second, test a number of different cigarettes to obtain, if possible, a rank over which the propensity to ignite upholstered furniture substrates varies; and third, develop a test which predicts this propensity of cigarettes to ignite upholstered furniture substrates.

(2) Only machine-made cigarettes would be used in the test development. No attempts would be made to obtain any of the cigarettes made under the about 20 patents for "self-extinguishing" cigarettes, as long as they would be hand produced and their reproducibility would be in question.

(3) The ranking of the cigarettes would be determined by placing them on the fabric/filling material substrates of varying ignitabilities. Ranking would be based both on smoldering ignition vs. non-ignition, and if ignition occurred, on the time to ignite.

(4) The fabric/filling material substrates would be tested in the horizontal configuration, as in the mattress tests [4,8,9] rather than in a crevice configuration (formed by a horizontal and a vertical member) as in the above mentioned upholstered furniture tests [5,10-13]. This was done because the intent was to provide relative rankings of cigarettes and of upholstered substrates, not to test fabrics and filling materials in a near worst case configuration.

(5) The experimental work was carried out under the following conditions: air flow at the test location was 10-15 m/min. In the early experiments, cigarettes were placed at random directions; later, they were placed so the burn direction was in the direction of the air flow. Laboratory temperature varied between 17 and 23°C, and relative humidity from 30 to 65 percent.

2.1.2 Experimental Procedure

About 25 cellulosic fabric-foam combinations were tested with a number of commercial cigarettes. The fabrics varied widely in weight and construction. Of these, five were identified in preliminary tests as representing a spectrum of cigarette ignitability. These fabrics were stretched over pieces of commercial polyurethane foam, all cut from the same piece. Cigarettes were placed on the fabrics for 1, 2, 3...minutes, and then removed, or the cigarettes were left to burn their whole length. If no smoke or heat was observed five (later extended to 10) minutes after cigarette removal, non-ignition (NI) was noted; otherwise the notation I (ignition) was used.

More than 30 U.S. and foreign filter and non-filter cigarettes, varying in weight, diameter, length, and tar and nicotine content were placed on at least two of the five fabrics. Cigarettes which varied in time to ignite on these two fabrics were tested on all five fabrics. The results for six such cigarettes are shown in Table 2. Most of the other brands behaved similarly to cigarettes A and B. Based on the matrix shown in Table 2, it appears that there were five graduations of propensity to ignite the various fabrics, in terms of both whether the cigarettes ignited the fabrics or not, and if they ignited the fabric, the time to ignite upholstered furniture substrates. Thus, a ranking of cigarettes with respect to ignition propensity can be established; it was the basis for development of a test to predict this propensity, as discussed in 2.2, below.

The non-filter and filter cigarettes A and B gave similar results in the present tests, as did the same non-filter and a different filter cigarette brand in a recent study on 72 furniture cushions [25]. Other studies, with different fabrics and filling materials, found filter cigarettes less likely to cause ignition [34]. In a non-filter cigarette, air has access to the burn cone from both ends of the stub, and a more intensive glow and presumably more heat flux occurs. This does not occur with filter cigarettes and they may not ignite some "borderline substrates" which ignite with non-filter cigarettes.

Cigarettes A, B, and C had normal circumference; cigarettes D, E, and F were smaller. Cigarette C was a very low tar/nicotine type, the others normal or high tar/nicotine. Cigarette C had ventilation holes at the base of the filter.

Times to ignite listed in Table 2 varied only from 2 to 7 minutes. With one exception, whenever a cigarette was found to have an ignition time of 4 or more minutes on one fabric, it did not ignite the fabric with a lower ignitability listed below it.

Table 3 shows results of an experiment performed to extend the work on the ranking of cigarettes. Cigarettes A, B and F, and two fabrics which were used in the experiments leading to Table 2 were used again in these tests. Four types of experimental foams were tested. They were described as flame retardant (FR) and non-flame retardant (NFR), each represented in two densities, with the denser foam intended for seats and the other for backs of furniture.

The results shown in Table 2 were essentially confirmed. Cigarette F clearly had lower propensity to cause smoldering ignition, although it ignited the denser NFR foam with both fabrics. Cigarettes A and B again performed very similarly, and it again took longer to ignite the damask than the velvet. Among the NFR foams, the lighter foam had longer ignition times than the heavier one; among the FR foams these differences were smaller, and reversed. Some of these foam-fabric combinations were re-tested by a different operator about six months later, and the same ignition times or times differing by no more than 1 minute were obtained.

Table 4 presents another attempt to rank cigarettes according to their propensity to ignite furniture substrates. Experimental cigarettes from the third set of cigarettes produced for the National Cancer Institute Smoking and Health Program [35] were chosen because of their

TABLE 2. Propensity of Commercial Cigaretttes to Ignite Various Fabric/Foam Substrates

			Cigarettes					
			A	B	C	D	E	F
	Type		non-filter	filter	filter	filter	non-filter	filter
	Diameter		normal	normal	normal	small	small	small
	Tar/nicotine		normal	normal	low	normal	normal	normal
Fabric								
Description	Weight		Ignition Time					
	g/m^2	oz/yd^2	min.					
Homespun, light backcoating	665	19.5	2	2	3	4	5	NI
Velvet	465	13.7	2	2	2	4	NI	NI
Damask, red-blue-green	630	18.2	3	3	7	NI	NI	NI
Damask, red/beige	490	14.5	5	5	NI	NI	NI	NI
Velvet(loop), backcoating	390	11.5	NI	NI	NI	NI	NI	NI
Weight loss - rate of cigarette/standard paper system, mg/min								
average			52.8	48.3	41.3	30.0	14.9	13.7*
stand. dev.			3.6	4.0	2.9	0.72	2.8	--
Burn rate in air, mm/sec x 10^{-3}			10.2	7.7	10.8	6.61	5.41*	4.77*
Weight loss rate, of four layers of standard paper stapled together								
per cm of cigarette, mg/cm			18	16	8.2	8.9	5.6	2.8
per volume of cigarette, mg/cm^3			41	35	18	28	8	16

*These cigarettes sometimes self-extinguished.

TABLE 3. Propensity of Commercial Cigarettes to Ignite Various Fabrics and Experimental Foams

Fabric	Foam			Cigarettes		
	Type	Use	Density kg/m^3	Ignition Times, min. A	B	F
Velvet, 465 g/m^2	NFR	Seat	1.18	2	2	3
		Back	1.04	4	4	NI
	FR	Seat	1.20	3	3	NI
		Back	1.12	3	4	NI
Damask, 630 g/m^2	NFR	Seat	1.18	3	3	4
		Back	1.04	5	5	NI
	FR	Seat	1.20	5	5	NI
		Back	1.12	4	4	NI

NFR: not flame retardant

FR: flame retardant

TABLE 4. Some Physical, Chemical, and Ignition Propensity Characteristics of Selected Experimental Cigarettes

Cigarette Code [a]	74	76	77	78	89[b]	90[b]
Paper porosity, cm^3/min [a]	--	5	60	100	--	100
Total particulate matter, mg/g tobacco burned [a]	35.35	49.94	30.88	28.48	28.96	31.16
Nicotine, mg/g tobacco burned [a]	2.00	2.65	1.76	1.80	1.63	1.90
Tar, mg/g tobacco burned [a]	30.52	42.92	26.79	24.58	23.97	24.72
CO, ml/g tobacco burned [a]	17.39	26.45	14.88	15.33	11.15	8.45
CO_2, ml/g tobacco burned [a]	35.19	48.55	33.58	34.61	26.11	23.35
Static burn rate, avg./s.e., mm/min [a]	4.266/0.07	3.063/0.10	4.489/0.10	4.617/0.15	4.883/0.21	4.566/0.15
Peak coal temperature, avg./s.e., °C, at: [a] 15 mm mark	782.0/22.3	802.6/9.1	842.0/13.5	823.0/12.7	800.1/5.2	827.1/8.6
55 mm mark	816.8/21.3	838.1/21.7	806.9/8.4	832.5/16.9	768.0/8.2	816.9/11.8
Ignition time, min., on:						
homespun fabric	2	2	2	2	2	2
damask	3	4	3	3	3	3
velvet: no ignitions/5 tries, min.	1	1	1	1	1	1
5 ignitions/5 tries, min.	2 1/2	7+	2 1/2	3	2 1/2	3
Weight loss rate:						
cigarette/paper system, avg./s.d., mg/min.	55.7/2.4	47.7/2.9	54.1/9.0	52.8/3.4	49.6/3.8 [c]	53.3/2.5 [c]
paper only, four layers, mg/min.	0.22	0.18	0.18	0.13	0.05	0.05

[a] Data from reference 35.

[b] These cigarettes had a dilution filter with a larger diameter than the rest of the cigarette.

[c] Tested with dilution filter removed; with dilution filter results were 44.9 and 44.6 mg/min. because of poor contact between paper and cigarette.

wide variation in a number of parameters. Among these were cigarette paper porosity and absence or presence of a "dilution filter"; wide variations in tar, nicotine, CO and other smoke constituents produced when these cigarettes were smoked on a smoking machine; and static burn rate and peak coal temperatures. In spite of the differences in burn behavior these cigarettes produced no differences in ignition time on three fabrics over commercial foam, except for the longer ignition time (with poor reproducibility) found for Cigarette 76 which has very low cigarette paper porosity.

To further investigate ignition times of these cigarettes, they were placed on the velvet fabric for 1, 1-1/2, 2, ... etc. minutes, instead of the usual one minute steps. The time at which none of the three to five cigarette replicates ignited the substrate, and the time at which all replicates ignited it, is shown in Table 4 (the differences in those two times tended to be larger in these experimental cigarettes than in commercial cigarettes for which it varied between 1/2 and 1-1/2 minutes). Still, no major differences in ignition time for these cigarettes, except No. 76, could be established.

These findings suggest that cigarette parameters usually measured by industry such as burn rate and coal temperature, do not control the propensity of the cigarettes to ignite furniture substrates. Probably such parameters as contact area between cigarette and substrate and heat flux in the contact area affect this propensity.

2.2 Choice of Test Concept

The above investigation was performed to identify cigarettes with a graduated propensity to ignite upholstered furniture substrates, and

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learn more about the interaction of various cigarettes and such substrates, since most previous work had been performed with only one cigarette. The next step was to develop a laboratory method which would correlate with the ranking of the cigarettes.

After considerable experimentation, two factors became apparent:

- a meaningful test would have to involve cigarettes lying on and interacting with a substrate, rather than the measurement of characteristics of cigarettes burning freely in air. The latter is the usual approach to cigarette testing for quality control, smoke chemical constituents analysis, etc.

- the test method should not be based on commercial "standard fabrics" or "standard filling materials" such as foam or batting. UFAC, the California Bureau of Home Furnishings, CPSC, and NBS have had great difficulties in the procurement of such "standard" materials in a reproducible form. Upholstery fabrics, foam, and batting have thus far not been produced to the close tolerances needed for use in tests of the kind envisioned here, and the market for such standard materials would generally be too small to make it worthwhile to introduce costly production controls only for this purpose. We are aware that UFAC and the Society of Plastics Industry are working to provide standard materials, but they are not available at this time.

The following characteristics of cigarettes were investigated, to see if they would correlate with the propensity to ignite upholstered furniture:

1. static burning rate of cigarettes
2. temperature of burn cone on the cigarette surface
3. burning behavior of cigarettes in contact with heat sinks, e.g., metal gauges of varying thickness
4. burning behavior of cigarettes placed on chromatography paper, which showed the most promise.

The details are discussed below.

2.2.1 Burning Rate of Cigarettes in Air

Table 2 shows that the burning rate of cigarettes suspended freely in air related to cigarette ignition propensity with one notable exception: cigarette C, which burned relatively fast, ignited fewer fabrics, and frequently had longer ignition times than cigarettes A and B, which had a somewhat lower burning rate. This may have been due to a combination of factors: perhaps the burn cone of this cigarette moved so rapidly that there was insufficient time to ignite some of the substrates. Cigarette C also had a low packing density so that may have been not enough fuel in the burn cone to cause ignition of some substrates. On the other hand, cigarette 76 of the experimental cigarette series (Table 4) had a lower burning rate than the others, and longer ignition times.

Commercial cigarettes E and F (Table 2) tended to self-extinguish in air, but ignited some fabric/foam substrates. This indicates that burning rate in air could not be used to differentiate between cigarettes on the lower end of the cigarette ignition propensity scale.

Furthermore, it was established that the cigarette diameter, and thus the area of contact with a surface, has at least a modest effect on the ignition propensity. An oval cigarette took about 1 minute longer to ignite a certain fabric/foam system when its narrow side was in contact with the fabric than when it was placed on its wide side. Cigarettes D, E, and F have small diameters and relatively low ignition propensity; however, they probably differ in other parameters as well. Based on this combination of findings, it appeared preferable to develop a test in which the cigarette is in contact with a surface.

2.2.2 Burn Cone Temperature

The peak coal temperature of the burn cone is listed in Table 4 for the experimental cigarettes. It varies greatly over the length of the cigarettes, and correlates poorly with ignition time. A brief attempt to relate burn cone temperatures of cigarettes A to F also showed little promise. Attempts to measure the temperature at the interface of fabric and cigarette demonstrated significant experimental difficulties -- the thermocouple may interfere with fabric-cigarette contact as the smoldering front passes, and the results show poor reproducibility.

2.2.3 Contact with Heat Sinks

In another attempt to develop a simple test method, cigarettes were allowed to burn freely in air until they contacted steel gauges of varying thickness. Even thin gauges extinguished all cigarettes. It may be possible to identify graduated heat sinks which would differentiate between the various cigarettes but this approach was not pursued.

2.2.4 Burning Behavior of Cigarettes in Contact with Chromatography Paper

It appeared that a useful test concept would incorporate use of a reproducible material which would interact with smoldering cigarettes. A material used in chemical analysis, an alpha cellulose paper which is also used for the calibration of the Smoke Density Chamber [36,37] seemed to be promising for the present purpose. This paper[2] is manufactured for use in chromatographic chemical analysis, and has been found to be reasonably reproducible with respect to smoke production under certain heat conditions. It was decided to use it as the substrate to be placed under smoldering cigarettes, as described in Appendix I of this report. The paper smolders along with the cigarette but does not continue smoldering when the cigarette goes out. In the proposed test, the cigarette is placed on one layer of the standard paper, suspended by four pegs above a platform. A load cell connected to the platform is used to record the weight loss of the cigarette-standard paper system. The rate of weight loss, in mg/min, is determined.

Table 5 shows some results with standard paper sheets taken from the same lot and from different lots, obtained by two operators over a period of several months. The reproducibility appears satisfactory, especially considering that the environmental conditions in the laboratory were not closely controlled, and that the cigarettes were taken from packs which had been opened for various periods.

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[2] This paper, certified for use in calibration of the smoke density chamber, is available as Standard Reference Material 1006a from the Office of Standard Reference Materials, National Bureau of Standards, Washington, D.C. 20234. See Appendix I.

TABLE 5.

WEIGHT LOSS RATE OF CIGARETTE/STANDARD PAPER SYSTEMS: EFFECTS OF STANDARD PAPER LOT AND SHEET, AND OPERATOR

CIGARETTE - A	WEIGHT LOSS RATE (mg/min)	STANDARD DEVIATION (mg/min)
LOT 1		
OPERATOR 1	52.8	3.6
OPERATOR 2		
SHEET A	48.3	3.2
SHEET B	52.6	3.9
LOT 2		
OPERATOR 2	52.7	3.7
CIGARETTE - C		
LOT 1		
OPERATOR 1	41.3	2.9
OPERATOR 2		
SHEET A	39.3	3.1
SHEET B	36.4	2.7
LOT 2		
OPERATOR 2	38.4	2.9
CIGARETTE - 76		
LOT 1		
OPERATOR 2	37.7	2.9
LOT 2		
OPERATOR 2	34.5	3.7
CIGARETTE - 77		
LOT 1		
OPERATOR 2	55.4	6.9
LOT 2		
OPERATOR 2	54.1	9.6

The weight loss time plots for the cigarettes tested were essentially linear. This is of interest because it agrees with the finding that ignition times for the furniture substrates did not vary with cigarette length, i.e., the ignition propensity also appears reasonably constant over the length of the cigarettes. Any change in the weight loss rate would be readily apparent. The time at which the cigarettes self-extinguish can also easily be determined from the plots. These factors could thus be taken into consideration in ranking cigarettes by this method.

Table 2 and Table 4 compare the weight loss rates (mg/min of cigarette/paper system) with the behavior of the cigarettes on upholstered furniture substrates. Weight loss rate correlates with ignition time, or number of fabrics which ignited in Table 2. Considering that control of ambient conditions was poor, that the foams used for testing the commercial and the experimental cigarettes were different (which may affect ignition times somewhat) and that the experimental cigarettes showed considerable variability, the weight loss rate method seems promising for prediction of cigarette propensity to ignite furniture substrates.

The dilution filters of cigarettes 89 and 90 (Table 4) had a larger diameter than the cigarettes and apparently reduced contact between the cigarette and the standard paper. With the filters in place, the weight loss rate was about 5 mg/min lower than when the filters were removed before testing. The effect of filter removal on ignition of the fabrics was not clear cut. One could assume that the fabrics have rougher surfaces than the paper, and that the presence of

protruding filters becomes less important on the fabric. The test method shown in Appendix 1 suggests removal of protruding filters, and selection of cigarettes with as close as possible to cylindrical shape for tests.

The choice of weight loss rate of the system consisting of one sheet of standard paper and a cigarette was preceded by considerable experimentation with multiple sheet layers. Up to four sheets were tried; for some cigarettes, this resulted in considerably larger weight loss than with single sheets. In fact, it was originally planned to rank cigarettes simply by the number of sheets which would show signs of charring, so that no recording equipment would be needed. However, multiple sheets tend to curl in contact with the burning cigarettes, so that contact between the sheets becomes poorly controlled. Attempts to overcome this by stapling or glueing at the edges were made but were found to be time consuming without ranking the cigarettes in exactly the same order as the fabric burn experiments. All things considered, the single sheet method appeared preferable.

2.3 Cigarette Ignition of Wildland Material

A brief attempt was made to confirm the relative propensity to ignite furniture substrates found for Cigarettes A to D with wildland materials, such as dried grass and pine needles. Qualitatively, it was easy to see that Cigarettes C and D caused a lower smoldering rate and smaller smoldering areas before self-extinguishment than Cigarette A. However, systematic experimentation to obtain quantitative results required more time for exploration of experimental conditions than was

available. It was found that wildland materials must be packed fairly tightly to obtain smoldering and/or flaming ignition, especially with the relatively high relative humidity in our laboratories. Considerable airflow was needed to obtain ignition. Other workers have defined some of the conditions for such experimentation but their results probably would not fully apply to present day cigarettes [29,30].

2.4 Background for Choices of Test Conditions and Areas of Additional Work

This section describes the background for choices of a number of test conditions in the attached test method. For some of these, only brief or no investigation of the effect of varying the conditions was conducted.

Laboratory conditions: laboratories of cigarette manufacturers are usually held at 24°C and 60% r.h. and these are the conditions specified in the attached test method. Twenty-four hour conditioning also is usual in cigarette testing.

Air flow: the test method specifies a 3.3 m/min air flow because it would minimize interference with the load recording mechanism and is considered easily attainable in most laboratory hoods. Air velocity and direction relative to the burn direction of the cigarette affect both cigarette ignition propensity for wildland materials [30,31] and cigarette burning rate [38]. The test method specifies draft direction along the burn direction, which according to the literature, results in the highest burn rate.

Cigarettes have double-layer paper seams. The test method specifies that this seam be on top of the test cigarette. The effect of the seam location on the test results has not been investigated.

Although originally intended for an unrelated purpose (chemical analysis), the standard paper used in this test was calibrated for producing a certain behavior under closely controlled conditions of radiative heating [36,37]. In our view, this paper is more appropriate for the present purpose than less closely controlled materials such as foams or fabrics, even though they would have closer resemblance to upholstery materials. Development of a calibration method to assure controlled smoldering of the paper would be desirable, but was not possible within the framework of the present project.

Although it was not a significant problem in our experiments better reproducibility could perhaps be obtained by placing the paper in a frame (large enough not to act as a heat sink) instead of letting it rest on four pegs, the present arrangement. This may minimize any bending or curling of the paper in the area of the burn cone.

The candidate test method was developed based on the behavior of presently available, commercial cigarettes. It is difficult to foresee potential future developments which could produce cigarettes which give anomalous results with the present test method, compared to their tendency to ignite upholstered furniture substrates. Many of the same phenomena occur in both the test and in the actual furniture ignition scenario, but there is no guarantee that the results of the two must correlate. There are at least two cases where they conceivably will not.

One involves cigarettes which make little contact with substrates because of spacers or use of intumescent materials on the paper (as covered by several patents). Such cigarettes could have low propensity to ignite substrates but could still show a significant weight loss rate in the proposed test. If this becomes a problem, the appended test method could be changed to require that unusually low charring of the standard paper, as judged visually, be reported, so that the above situation would be recognized. For such cases, a comparison of the cigarette/ standard paper system weight loss and the weight loss of the paper may be preferable for characterization of the ignition propensity. As stated before, more specific recommendations for evaluating such cigarettes cannot be made since none were available for experimentation.

A second possibility is that some cigarettes produced now or in the future may self-extinguish soon after being placed on the standard paper, and that their ignition propensity could not be measured with the present arrangement. Such cigarettes may still differ in their propensity to ignite furniture substrates. A need for extending the sensitivity range of the test method would thus arise. If such cigarettes appear, the test could be changed to extend into lower ranges of ignition propensity by using a crevice or trough arrangement, with two strips of the standard paper at right angles. Cigarettes would presumably continue to burn in such crevices even if they self-extinguish on the horizontal paper strip used now. Since the cigarettes used in the present work presented no major problems of self-extinguishment, the crevice arrangement was not investigated in depth.

In the course of this work several factors could only be investigated to a limited extent. The most important of these are:

1. The Range of Substrates. It would be desirable to check the cigarette rankings with a wider range of fabrics and filling materials since there are thousands of fabric and filling combinations which previous work [14-26] has shown to be susceptible to cigarette ignition. Similarly, the ranking of cigarettes may be affected by furniture configurations, such as crevices between cushions and sides or backs forming various angles, concave cushion surfaces, etc.

2. The Wide Variety of Cigarettes. Only about one sixth of the about 180 available U.S. commercial cigarettes and a few foreign cigarettes, were investigated. Extension of this test population may be desirable, both in terms of their ranking on fabric/filling material substrates and weight loss rate. Work with additional cigarettes from the Smoking and Health Program may help in understanding the mechanism of cigarette ignition of various substrates, since these cigarettes are systematically varied in selected parameters, and many physical and chemical measurements have already been performed on these cigarettes. Similar information is not generally available for commercial cigarettes.

3. Further Exploration of the Candidate Test Method. Why did the weight loss rate of the cigarette/standard paper system rank the cigarettes in the order of their propensity to ignite furniture substrates while the weight loss of the paper alone did not? One possible reason may be the fact that the paper sheet smolders only where it is in contact

with the heat source, and thus there is only a limited amount of material which can lose weight, regardless of the burning intensity of the cigarette. (Using a thicker material would overcome this difficulty, but no well standardized source of thick, pure alpha cellulose was found; use of multiple layers of the standard paper presented experimental difficulties, as discussed earlier). This may make the method somewhat insensitive for cigarettes with relatively high heat flux. In such cases, the weight loss of the cigarette/standard paper system, which includes the weight loss of the cigarette (which in turn can be assumed to be related to heat flux), appears preferable. However, this point bears further investigation.

3. SUMMARY AND CONCLUSIONS

Most previous work on the ignitability of upholstered furniture was performed with one kind of cigarette. The present report describes experimentation with commercial and experimental cigarettes having a substantial of range of burning behavior, and their interaction with a number of upholstered furniture fabric/filling material substrates. A draft candidate test method for the measurement of the propensity of cigarettes to cause smoldering ignition of upholstered furniture is attached as Appendix I.

Upholstered furniture fabrics vary widely in their propensity to be ignited by lighted cigarettes. The lighter weight cellulosic fabrics (cotton, rayon, linen) and the medium to heavy weight thermoplastic

fabrics (nylon, olefin, polyester) rank relatively low in this propensity. Medium to heavy weight cellulosic fabrics are relatively cigarette ignition prone. The material under the fabric, the filling material, also greatly affects the cigarette ignitability of upholstered furniture, as do construction features.

A group of fabric/filling material substrates varying in cigarette ignitability was exposed to about 30 U.S. and foreign commercial cigarettes. The majority of the cigarettes behaved similarly, and ignited all fabrics. Several others ignited only a few of the fabrics. With the most ignition prone fabric, the ignition time was the same for all cigarettes. On the less ignition prone fabrics, the ignition times varied for the various cigarettes identified as having lower ignition propensity. Thus, a ranking of cigarettes according to ignition time and number of the fabric/filling material substrates ignited was possible. This ranking did not seem to correlate with such parameters often used to characterize cigarette burning phenomena, such as burn rate and burn cone temperature measured on cigarettes burning in air.

This type of classification was developed to rank cigarettes according to their propensity to ignite furniture substrates. It does not, however, permit more than a rough, qualitative estimate of the relative ignition hazard of the six cigarettes in terms of possible furniture fires in American homes. One can say with some assurance that, if all cigarettes performed like D, there would be "fewer" fires than if all performed like A or B. It is not possible to quantify "fewer"; this would require knowledge of the cigarette ignitability of upholstered furniture presently in American homes. Such information is

not available, nor will it be easily obtainable for furniture built in the future, since fabric and filling material change with fashion, relative price, etc. The recent trend has been to more ignition-resistant materials, such as thermo-plastic fabrics and upgraded filling materials. In addition, a substantial portion of furniture is being built to UFAC requirements.

A test method was developed which takes into account the behavior of cigarettes when they burn on a substrate (Appendix I). A burning cigarette is placed on a strip of a standard alpha cellulose paper used in chromatographic analysis. The weight loss rate of the cigarette/standard paper system is determined. This correlates with the rankings of the cigarettes on fabric/filling material substrates.

The choices of test parameters are explained. In some cases, they were based on results of a laboratory investigation; in others, on the best available knowledge. Areas in which further investigation would be desirable are outlined. The most important such area is testing of a greater number of commercial and experimental cigarettes by the test method and comparison of the results to ignitability rankings obtained from placing the cigarettes on a wider variety of upholstered furniture substrates.

Ignition times will vary with cigarette and substrate and may be as short as 1 minute. Self-extinguishing time for a cigarette will depend on the substrate on which it rests. Self-extinguishment time alone will not define the propensity of a cigarette to ignite upholstered furniture.

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APPENDIX I

TENTATIVE METHOD FOR MEASUREMENT OF THE PROPENSITY OF CIGARETTES TO IGNITE UPHOLSTERED FURNITURE AND MATTRESSES

1. Scope

This test method is intended to measure the propensity of commercial cigarettes to ignite upholstered furniture and mattresses when lighted and dropped on them.

2. Definitions

Ignition: continued smoldering, as indicated by smoke and heat development, of an upholstered furniture or mattress substrate after a cigarette has been placed on it. The smoldering may or may not lead to flaming ignition.

Burning time: the time between the placement of the cigarette on the standard paper and the extinguishment of the cigarette, as indicated by the recorder trace.

3. Summary of Method

Burning cigarettes are placed on horizontal strips of a standard, alpha cellulose paper and the weight loss rate of the cigarette/paper system is measured.

4. Apparatus

The apparatus consists of a holder for strips of a standard paper, which is attached to a load measuring device (Figure 1). A recorder plots the weight change as the cigarette smolders on top of the standard paper.

4.1 Holder: a piece of polymethyl methacrylate (PMMA) or similar material, 5 x 10 cm, 2.5 mm thick, suspended horizontally over a load cell. On top of the PMMA sheet, at each corner, is a 6 mm high, 6 mm diameter PMMA rod.

4.2 Load measuring device: a load cell with at least a 10 g useable range. The load cell is connected to a compatible strip chart recorder. The load cell-recorder system shall be capable of indicating weight changes of 1 mg/min.

4.3 Standard paper: a paper used in chromatographic measurements, described in Attachment 1 to the method, cut into 150 x 50 mm strips.

4.4 Hood: a hood with a horizontal draft of 3.3 ± 0.3 m/min at the face of the loading platform shall be used.

5. Conditioning

Opened packages of cigarettes (from which the test specimens shall be taken) and standard paper strips shall be conditioned at 24 ± 2°C and 60 ± 2% r.h. for at least 24 hours.

6. Procedure

6.1 Cigarette selection: sample one cigarette from the package, and inspect it visually. Reject broken or otherwise deformed cigarettes. If filter has larger diameter than the body of cigarette, remove it.

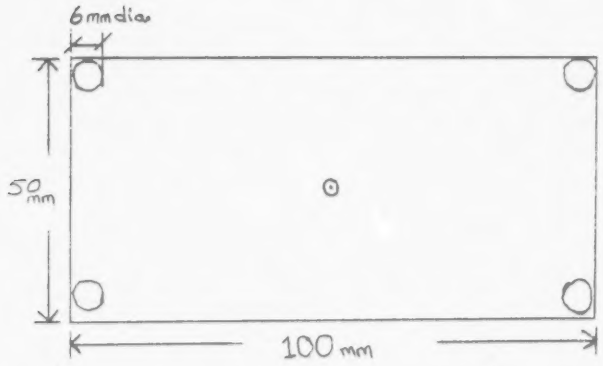
6.2 Place a strip of standard paper on the four rods of the load platform so that its longer direction is aligned with the movement of the air in the hood.

6.3 Start recorder, and place lighted cigarette, with approximately 4 mm of tip burned and the cigarette paper seam on top, on the standard paper strip, so that the direction of burning is the same as the direction of air flow.

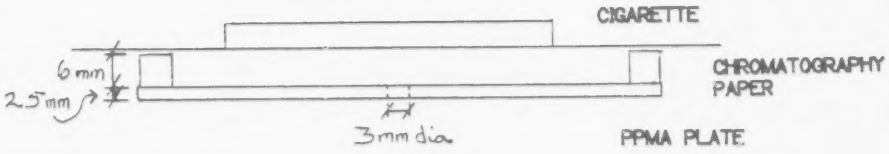
6.4 Stop recorder when there is no further weight loss.

6.5 If a test cigarette extinguishes before burning its whole length the test must be repeated with a fresh cigarette on a new strip of standard paper. If five successive cigarettes self-extinguish before burning their whole length, calculate weight loss rate on basis of the incompletely burned cigarette, and note burning times.

6.6 For each of five cigarettes, calculate weight loss rate. If weight loss rate varies over length of cigarette, other than within 1 minute before extinguishment, note all weight loss rates extending over two minutes or more, and the time during which they prevailed.



TOP VIEW



SIDE VIEW

SCALE 1":1"

FIGURE 1.

U. S. Department of Commerce
Philip M. Klutznick
Secretary

National Bureau of Standards
Ernest Ambler, Director

National Bureau of Standards

Certificate

Standard Reference Material 1006a

Smoke Density Chamber Standard

Non-flaming Exposure Condition

This Standard Reference Material is recommended for checking the operation of smoke density chambers under non-flaming exposure conditions. However, it does not obviate the need for following the prescribed calibration and standardization techniques outlined in the test procedure. Due to gradual aging of cellulose-base papers, there may be some change in the certified value with time. Therefore, the smoke density measurements are determined periodically and changes made accordingly in the certified value. This value is certified for a period of four months from the date of certification.

The certified value for maximum specific optical density is:

Date of Certification: _____

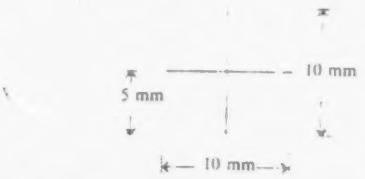
D_m = _____*

$D_{m\ (corr.)}$ = _____

These mean values are the result of 72 tests on representative samples of a lot of 0.036 inch (0.91 mm) thick cotton-linter paper (principally α-cellulose). The estimate of precision is the computed standard deviation based on 72 measurements. Smoke density measurements were made under non-flaming exposure conditions in accordance with the detailed procedures outlined in American Society for Testing and Materials (ASTM) Standard E 662-79, "Test Method for Determining the Specific Optical Density of Smoke Generated by Solid Materials," and in National Fire Protection Association (NFPA) 258-1976, "Standard Test Method for Measuring the Smoke Generated by Solid Materials."

Note: For this particular test material, a small cross must be cut through the thickness at the center of the specimen with a sharp razor blade. Each cut should have a total length of 10 mm and the arms of the cross should extend 5 mm from the center point (see figure below). Prior to test, the material must be dried for 24 hours at 60 °C and then conditioned to equilibrium at 23 ± 3 °C and 50 ± 5 percent relative humidity.

Cross 10 mm x 10 mm must be cut through SRM 1006a.



The original measurements for certification of this Standard Reference Material were performed by F. G. Lee of the Center for Fire Research using a commercially available smoke density chamber. Recertification of this material was performed by J. Randall Lawson of the Center for Fire Research.

*Without correction for window deposit.

Washington, D.C. 20234
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George A. Uriano, Chief
Office of Standard Reference Materials

NBS-114A (REV. 2-8C)

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4. TITLE AND SUBTITLE

DEVELOPMENT OF A CANDIDATE TEST METHOD FOR THE MEASUREMENT OF THE PROPENSITY OF CIGARETTES TO CAUSE SMOLDERING IGNITION OF UPHOLSTERED FURNITURE AND MATTRESSES

5. AUTHOR(S)

John F. Krasny, Paula J. Allen, Adalberto Maldonado, and Nilsa Juarez

6. PERFORMING ORGANIZATION (If joint or other than NBS, see instructions)

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DEPARTMENT OF COMMERCE
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National Bureau of Standards
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10. SUPPLEMENTARY NOTES

☐ Document describes a computer program; SF-185, FIPS Software Summary, is attached.

11. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here)

A candidate test method for the measurement of the propensity of cigarettes to cause smoldering ignition of upholstered furniture and mattresses was developed. It consists of placing burning cigarettes on pieces of a standard, alpha cellulose, chromatographic paper and measuring the weight loss rate of the paper/cigarette system. The results were compared to the propensity of cigarettes to ignite upholstered furniture substrates. The agreement was satisfactory. Of the approximately 30 cigarette brands investigated, most had a similar propensity to ignite the upholstered furniture substrates, but a few ignited fewer substrates, and exhibited longer times to ignition on those which ignited. Many upholstered furniture substrates resisted ignition by any cigarette, while others were ignited even by those commercial cigarettes which ranked lowest in ignition propensity in these tests. However, a substantial number of upholstered furniture types did ignite with some cigarettes but not with others. Self-extinguishment time does not define the propensity of a cigarette to ignite upholstered furniture.

12. KEY WORDS (Six to twelve entries; alphabetical order; capitalize only proper names; and separate key words by semicolons)

Cigarettes; flammability; ignition; mattresses; self-extinguishment; smoldering; upholstered furniture

13. AVAILABILITY

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ITEM 4. LETTER FROM PETER A. BRIGHAM, PRESIDENT, THE BURN FOUNDATION, PHILADELPHIA, PA., TO SENATOR JOHN HEINZ, CHAIRMAN, SENATE SPECIAL COMMITTEE ON AGING, DATED AUGUST 3, 1983

DEAR SENATOR HEINZ: I would like to congratulate you on the forthright position you took at the Senate committee hearing on July 28, regarding the problem of burn injury to the elderly in general, and the firesafe cigarette in particular. Our four-member burn centers, which every year treat some 400 victims of severe burn injury from throughout eastern Pennsylvania, have seen the results of all too many tragic fires which could be prevented with a concerted approach to the primary ignition source of fatal residential fires—the cigarette.

I would also like to express strong support for your proposal to introduce new legislation which would support a study of the technological and economic feasibility of a firesafe cigarette. This would be a very sound way to deal with the opposition of those who claim that mandating a performance standard without such a study is premature. Such legislation should also:

(1) Embrace the establishment of a performance standard, once proven feasible.

(2) Provide for the establishment of a committee to oversee the progress of any such study, with broad representation and independent leadership.

(3) Not preempt State legislation in this area. State action is needed to maintain momentum, and the States should not be deprived of the prerogative of independent action.

We look forward to further information, so that we may contact your colleagues in Pennsylvania, New Jersey, and Delaware on this issue.

Sincerely,

PETER A. BRIGHAM, *President.*

ITEM 5. LETTER FROM ARTHUR C. DELIBERT, PRESIDENT, CITIZENS COMMITTEE FOR FIRE PROTECTION, WASHINGTON, D.C., TO SENATOR JOHN HEINZ, CHAIRMAN, SENATE SPECIAL COMMITTEE ON AGING, DATED AUGUST 4, 1983

DEAR SENATOR HEINZ: I am writing to extend our sincere thanks for last week's hearing on residential fire safety. Your exceptional knowledge of the subject matter and your deep concern for the public interest made it a most productive session.

I especially appreciated your incisiveness and determination in pursuing the issue of firesafe cigarettes. As you know, cigarettes are the leading cause of fire deaths in the United States today. There is strong evidence that safer cigarettes are feasible. It would indeed be tragic if the Federal Government failed to explore this possibility promptly and thoroughly.

Once again, our deepest thanks.

Sincerely.

ARTHUR C. DELIBERT, *President.*

ITEM 6. LETTER FROM LARRY E. KAUFFMAN, EXECUTIVE DIRECTOR, PENNSYLVANIA ASSOCIATION OF MUTUAL INSURANCE COMPANIES, HARRISBURG, PA., TO SENATOR JOHN HEINZ, CHAIRMAN, SENATE SPECIAL COMMITTEE ON AGING, DATED AUGUST 1, 1983

DEAR SENATOR HEINZ: During the last several weeks I have had conversations with committee staff with respect to fire safety and the elderly. The purpose of this letter is to organize those comments in written fashion.

(1) We discussed smoke detectors and premium reductions under homeowners insurance policies. There is a fairly standard 2 percent premium credit for installation of smoke detectors and "local" alarm systems. Insurers recognize that smoke detectors are a significant factor in saving lives because detectors provide an early warning to evacuate the dwelling. Their value in saving property is less certain. Consequently, insurers are willing to provide the premium credit as a lifesaving measure even though the credit will not necessarily generate better dwelling loss experience for homeowners insurers. The suggestion can be made, however, that early detection and evacuation can provide for early response by a fire department with an increased chance of limiting property damage. The suggestion can also be made that people who have detectors may be more fire safety conscious and know what to do if a fire occurs.

The 2 percent credit for smoke detectors should be understood both as it translates into dollars, and as it translates into a higher percentage of the premium representing fire and smoke losses.

The American Association of Insurance Services, a statistical agency for homeowners insurers, tell us that the average homeowners policy premium was $145 in 1981. Remember that the homeowners policy covers perils other than fire and smoke, such as windstorm, hail, theft, and personal liability. Forty-five percent of 1981 losses were caused by fire and smoke, meaning that $65 of the average premium goes to pay for fire and smoke losses. The 2 percent credit amounts to $2.90, or 4.5 percent of the $65 fire and smoke premium.

It is not likely that $2.90 is much of an inducement to purchase and install a smoke detector. How can homeowners insurers encourage the purchase of smoke detectors without providing a higher premium credit than is warranted?

The answer may be in providing a higher dollar credit on a one-time basis. Now, insurers provide that $2.90 average credit year after year. A one-time credit equal to the purchase price of a detector, and given when a policy is first purchased, may provide a stronger inducement.

Then there is the problem of making certain that the detector is actually purchased, installed, and maintained. The detector which is battery operated obviously needs a fresh battery periodically.

A scheme which provides a free smoke detector to the policyholder who returns a coupon after the initial policy purchase at least furnishes the detector to the interested policyholder. The scheme would need to be refined to encourage installation and maintenance. I believe at least one, and perhaps others, of our members would be agreeable to developing that kind of plan.

(2) There were related matters mentioned during my conversations with the committee staff.

Municipalities have adopted ordinances and programs requiring or providing for installation of smoke detectors in dwellings. For example, the Lebanon (PA) City Council is currently considering an ordinance which would require smoke detectors in habitational properties.

The Lancaster (PA) Bureau to Fire has recently initiated a large-scale smoke detector campaign with a goal of one detector installed in every occupied dwelling within 1 year. Detectors are to be sold at low cost; and are to be given to low income, fixed income, or elderly families. Firefighters will install the detectors for those people who cannot do it themselves.

There may be an opportunity for insurers and fire departments to become more closely allied in joint fire detector programs.

I recommended that the committee staff obtain a video tape copy of "Why America Burns," a production of WGBH in Boston, originally telecast on the PBS program NOVA. This documentary makes the point that the number of fire deaths could be cut in half if smoke alarms were installed in every home and we could eliminate careless smoking and arson as causes of fire.

I recall that "Why America Burns" also examines the propensity of cigarettes to start fires when accidentally dropped in furniture and bedding. There is an easy experiment that you and your staff can conduct privately. Test various brands, specifically filter brands, by lighting the cirgarette then allowing it to burn itself to the end. Watch for a red ember to drop from the cigarette just before the tobacco portion of the cigarette is finally consumed.

(3) The May/June 1983 issue of "The Journal of Insurance" published by the Insurance Information Institute contains an article on residential sprinkler systems. Assuming that the number of elderly people will continue to increase, and that new one to four family dwellings will be needed for the elderly, use of residential sprinkler systems should be encouranged.

I would be pleased to discuss these matters in more detail.

Sincerely,

LARRY E. KAUFFMAN,
Executive Vice President.

ITEM 7. LETTER FROM PETER HUGHES, LEGISLATIVE COUNSEL, AMERICAN ASSOCIATION OF RETIRED PERSONS, WASHINGTON, D.C., TO SENATORS JOHN HEINZ, CHAIRMAN, SENATE SPECIAL COMMITTEE ON AGING, DATED AUGUST 22, 1983

DEAR SENATOR HEINZ: I commend you on your leadership in addressing the residential fire problems faced by older Americans. At the Special Committee on Aging hearing on July 28, 1983, it was stated that nearly one-third of the 4,000 fire victims in 1981 were persons 65 and older. Further examination of the 1981 fire statistics shows that 40 percent of the fire victims were persons 55 and older.

With over 14.8 million elderly members, the association is extremely concerned about the elderly fire safety issue. Recognizing that one-third of all U.S. residential fires are started as a result of careless cigarette smoking, AARP supports an investigation should be conducted as objectively as possible, with an advisory or oversight committee that represents the public and private sector.

Though the Consumer Product Safety Commission has made great progress in implementing voluntary flammability standards with upholstery and furniture manufacturers, older people are the least likely to desire or be able to purchase new upholstery or furniture. To prevent fire fatalities and injuries of older adults and all citizens, it is time to examine the leading ignition source—cigarettes.

In addition, AARP is concerned that the poor elderly are the least likely group to be able to afford the protection of smoke detectors. Considering that only one-third of persons 65 years and older have smoke detectors, that two-thirds of residential fires occur between 8 p.m. and 8 a.m., that 38 percent of residential fires burn over 40 minutes before detection, and that the majority of fire victims die from smoke inhalation, AARP would like to see a mechanism established for providing smoke detectors with proper installation and maintenance for low-income older adults. Of the recommendations made, i.e., community block grants and the weatherization program, appropriating and earmarking title III-B funds and directing area agencies on aging to institute a smoke detector program appears to be the most simple and direct route to assure success.

AARP issued a "safety alert" on smoke detectors in June 1983, and will continue to promote their use. In addition, a slide/tape program, "Fire! You Can Prevent It," is available on a loan basis to any interested group. The program was developed in 1981 in cooperation with the National Safety Council and covers the gamut from fire prevention to escape plans.

Once again, I commend you on your advocacy for the fire safety of older adults and extend AARP's support for legislation on these fire safety issues.

Sincerely,

PETER HUGHES,
Legislative Counsel.

ITEM 8. LETTER AND ENCLOSURE FROM JAMES H. SAMMONS, M.D., EXECUTIVE VICE PRESIDENT, AMERICAN MEDICAL ASSOCIATION, CHICAGO, ILL., TO SENATOR JOHN HEINZ, CHAIRMAN, SENATE SPECIAL COMMITTEE ON AGING, DATED JULY 22, 1983

DEAR SENATOR HEINZ: The American Medical Association takes this opportunity to inform you of our support for the concept of S. 51, "The Cigarette Safety Act."

According to the National Fire Data Center of the U.S. Fire Administration, cigarettes are the major cause of both residential fire injuries and fire deaths. Serious burns can be the most debilitating of all accidental injuries. While a "safe" cigarette would not eliminate all fires caused by careless use of smoking materials, efforts should be undertaken to reduce any cause of fires where possible.

The AMA has recently adopted two policy positions addressing this problem. In June 1981, a report relating to cigarette safety was approved by the AMA House of Delegates. This report discussed the legislation pending at that time and expressed support for "objective studies and the development of regulations requiring the manufacture, if feasible, of cigarettes with reduced capacity for causing fires." A copy of this report is enclosed. In June 1982, the AMA House of Delegates adopted a resolution providing: That the American Medical Association, recognizing that self-extinguishing cigarettes are available, continue its support of the concepts of H.R. 1854 and S. 51 (97th Congress), "The Cigarette Safety Act," which call for a study to determine the feasibility and the practicability of establishing a standard.

Passage of a cigarette safety act would be a positive step in reducing the number of residential fires. This is especially important in the case of the elderly who for various reasons, including increased disability and limited mobility, are more susceptible to injury in fires. If the development and marketing of "firesafe" cigarettes proves to be feasible, this would certainly be an excellent way to prevent potentially devastating injuries caused by fires.

Sincerely,

JAMES H. SAMMONS, M.D.

Enclosure.

FF. CIGARETTE SAFETY ACT
(RESOLUTION 72, I-80)
REFERENCE COMMITTEE B, PAGE 280)

HOUSE ACTION: ADOPTED IN LIEU OF RESOLUTION 72 (I-80)

Resolution 72 (I-80), which was referred to the board of trustees, calls upon the association to support a cigarette safety act "to require persons who manufacture cigarettes or little cigars for sale or distribution in commerce to meet performance standards prescribed by the Consumer Product Safety Commission, and for other purposes."

The issue of self-extinguishing cigarette legislation has been before the House previously (Resolution 20, I-79, and board of trustees report G, A-80). Resolution 20 called upon AMA to support H.R. 5504 (96th Congress). That bill would empower the Consumer Product Safety Commission to issue regulations establishing standards to insure that ignited cigarettes and little cigars would self-extinguish if not smoked for a 5-minute period. The board recommended that Resolution 20 not be adopted and that the association not endorse H.R. 5504 because the legislation was not specific on how cigarettes and little cigars are to be made self-extinguishing in 5 minutes. The report called for further research into self-extinguishing cigarettes.

The council on legislation has reviewed legislation introduced into the current Congress (S. 51 and H.R. 1858). These bills would authorize the Consumer Product Safety Commission to establish regulations that would set standards for cigarettes and little cigars so that they will have a "minimum capacity" for igniting upholstery and mattresses. The regulations would be based upon standards developed by the Commission based upon "objective studies, including studies conducted by the Bureau of Standards of the Department of Commerce." The regulations would be established through notice and comment rulemaking with oral presentations being allowed. After promulgation of a final rule, adversely affected parties would have a right to file a petition for judicial review of the regulations. The bill stipulates that the process used to meet the performance standards "cannot add additional toxic elements" to the cigarette or little cigars.

H.R. 1858 differs from S. 51 in that it requires the Consumer Product Safety Commission to terminate the regulatory proceedings prior to the publication of a final rule if it finds that setting such a standard would be "technologically impractical or economically unreasonable." The council received information that in 1979 fires started by cigarettes resulted in 2,300 deaths, 5,800 injuries, and $210 million in property damage.

In its consideration of these bills the council noted that they differed from the legislation considered in the 96th Congress. In the previous bills, the legislation called for cigarettes and little cigars to be made self-extinguishing during a 5-minute period, if not smoked.

The board believes that the incidence of smoking-related fires and the injury to smokers, as well as to innocent third parties caused when fire spreads to other apartments, hotel rooms, or buildings, could be significantly lessened if an economical and practical means were available to make cigarettes less likely to cause upholstery and mattress fires. However, the board is concerned with implementation through the Consumer Product Safety Commission to develop the regulations. The Commission is now the center of legislative controversy and is slated for substantial reductions in its funding and staff.

The board has approved the recommendations of the council on legislation expressing support for the concept embodied in S. 51 and H.R. 1858 that calls for objective studies and the development of regulations requiring the manufacture, if feasible, of cigarettes with reduced capacity for causing fires.

The board recommends that this report be adopted in lieu of Resolution 72 (I-80).

ITEM 9. STATEMENT OF GROVER E. CZECH, REGIONAL VICE PRESIDENT, AMERICAN INSURANCE ASSOCIATION, WASHINGTON, D.C., OFFICE

My name is Grover E. Czech, vice president, government affairs of the American Insurance Association. I am speaking for our engineering and safety services which represents more than 250 companies that write property and casualty insurance. These companies are vitally interested in preventing the loss of life and property because of fires.

We consider it a distinct privilege to appear before you today to present the support of our association for the widest possible use of smoke detectors by the elderly and by the general population. The Committee on Aging has an opportunity to perform a major service to the aging citizenry of our country.

The insurance industry is no stranger to fire prevention and building safety. The beginning of organized insurance loss control activities took place on July 18, 1866, when the National Board of Fire Underwriters was created by the insurance industry to focus on fire prevention. The national board, one of AIA's predecessor organizations, quickly became a leader in the field of loss control, and in 1905, developed and published the National Building Code, the first model building code used in this country.

Similarly, the first model electrical code was developed by a group of insurance underwriters and was the forerunner of the widely used National Electrical Code which was designed to govern the safe installation of electrical facilities.

There are other examples of our industry's involvement in the safety field. A one room testing laboratory set up by Midwestern insurance underwriters to test electrical installations in 1983 grew into Underwriters' Laboratories, Inc., which now operates as an independent scientific test facility staffed by over 2,000 engineers and other technical personnel. Realizing the need for a broad-based organization to develop standards in fire prevention, a group of technicians from the insurance industry formed the National Fire Protection Association, now an independent and internationally recognized standards producing organization.

With these basic beginnings, the services of the insurance industry spread widely to serve the entire Nation in the form of fire prevention campaigns, development of codes and standards, printing and distribution of technical material and booklets, dissemination of fire service training material, and consultations with governmental agencies, to name only a few.

Today, insurance companies are still recognized as leaders in the fire prevention and safety fields. AIA has its own engineering and safety service which works closely with subscribing companies in support of their loss control efforts. We estimate that there are in excess of 8,000 loss control representatives employed by companies subscribing to AIA's services and approximately 12,000 in the entire insurance industry. Company loss control representatives make underwriting and followup surveys of their insureds' premises on a regular basis; the frequency and service provided are commensurate with the size and complexity of the risk. These surveys consider all aspects of loss control, including fire safety, safety in the workplace, industrial hygiene and life safety. Our engineering and safety services staff and company representatives serve on more than 150 voluntary standards making committees of the National Fire Protection Association, American National Standards Institute, and other similar groups. As you can see, we remain committed to doing our part in the effort to save lives and reduce property losses.

Uncontrolled fire is a dreadful experience to all. But there are millions of Americans to whom fire plays an especially frightening role—the aging. Lacking the ability to cope adequately with fire accidents, these Americans deserve special attention. As their ranks swell the problem of fire safety becomes one of growing urgency each passing day.

It is not difficult to see why the elderly are especially prone to tragic fire accidents. Many lack the physical coordination to handle matches, cigarettes, or hot appliances safely. Others, mentally impaired or despondent, are somewhat careless with fire. When a fire accident does occur, physical or mental impairment can hamper chances of escape.

Whether it be in a senior care facility, housing for the elderly, a senior citizen club, or simply a single apartment, the limited capabilities of the elderly make the earliest warning of unwanted fire a necessity in order to provide the maximum time for escape. Every fraction of a second counts.

A proven method of reducing life loss in a fire situation is by the installation of smoke detectors and automatic sprinkler systems. In 1973, the National Commission on Fire Prevention and Control recommended that "early warning detectors and total automatic sprinkler protection or other suitable automatic extinguishing systems be required in all facilities for the care and housing of the elderly." The American Insurance Association was privileged to serve on that commission. We supported the recommendations of the commission then and we do now.

In fact, the American Insurance Association has distributed hundreds of thousands of the attached brochure "Sleep Easier With Smoke Detectors" which was first published in 1972 when smoke detectors were in their infancy.[1] The American

[1] Retained in committee files.

public now has caught on to their use, even to the point of giving them as Christmas and birthday gifts. It is estimated that more than half the households in the United States now are equipped with these devices. Many communities have enacted ordinances requiring their installation in newly constructed dwellings. Some cities, such as New York, require their installation in all apartments—new or old. Also attached is a very useful publication on smoke detectors prepared by the U.S. Consumer Product Safety Commission.[1]

A body of statistics on the actual number of lives saved because of the use of smoke detectors is still incomplete, but as reports are received and charts prepared, there is no doubt that these devices are having the greatest impact on the reduction of fire deaths experienced in recent history. The effect on property damage loss is less clear, but commonsense would suggest that the "early warning" provided by a smoke detector may result in some mitigation of fire loss severity.

Many insurers offer a discount in the 2 to 5 percent range to insureds using smoke detectors. As noted, there are no complete statistics on the actual savings related to the use of smoke detectors and the discounts are offered both as an incentive to encourage wider use and for competitive reasons.

We appreciate the opportunity to speak on this most important subject and we commend your committee for its interest in the issue. The AIA stands ready to assist you in any way we can regarding this matter.

[1] Retained in committee files.

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